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THE AMERICAN JOURNAL OF PHARMACY

AUGUST, 1918

EDITORIAL.

DELAYED PUBLICATION.

Printing establishments and editorial offices have not escaped the general demoralization of all business that has resulted from the existing war conditions. The delays have been numerous and at times annoying, yet we realize that these trials are only trifling experiences in comparison with what we may expect and what we are prepared to suffer to enable our country and its allies to win this war. We ask the indulgence of our readers if at times the monthly issues are delayed. They can rest assured that the JOURNAL management is doing its utmost to prevent this.

The demand for space in recent issues has been such that it has been necessary to postpone the publication of a number of accepted articles. The contributors will understand, of course, that under the present conditions it is not feasible to further increase the number of pages in the JOURNAL. In due time, we trust that all of these articles will be published to the satisfaction of our valued contributors, and we thank them for the patience and indulgence shown.

G. M. B.

THE GOVERNMENT IN NEED OF TECHNICALLY TRAINED ASSISTANTS.

In the correspondence column in this number is published a communication from the United States Patent Office calling attention to the need in this department for scientifically educated assistants. We are pleased to devote the space to this purpose and to aid the Federal Departments at all times in the securing of proper advice and assistance.

The need for specially trained examiners in the patent office is conceded. At times, this department has been criticized on account of patents issued without a proper examination of the scientific literature that would have demonstrated the lack of the originality or novelty claimed in the patent application and on which the patent issue was made.

In the December, 1917, number of the AMERICAN JOURNAL OF PHARMACY, editorial comment was made under the title of "The Departments of the Government Need the Advice of the Drug Trade." In this, attention was called to the fact that "many of the rules and regulations promulgated by the federal departments show *prima facie* a lack of actual knowledge of the industries affected. This is especially true as to the requirements of the drug trade and the prevailing conditions and trade customs under which the supplying of the needs of the inhabitants of the country for medicines and the industries for drug and chemical products has been carried on."

It is our contention that each Department of the Federal Government should have associated an advisory board composed of specialists in the various industries who could advise with the Department as to the appropriateness of the rules and regulations promulgated and the possibilities of legislation affecting these industries.

Under the present war conditions, the government has found it exceedingly valuable to have the advice of specialists in the various industries and manufactures, and there is at all times a corresponding need for such advice on the questions that arise under conditions of peaceful activities as well as the activities of war times.

G. M. B.

THE IMPORTANCE OF THE PHARMACIST TO MANKIND.

In an address delivered at the celebration of the twenty-fifth anniversary of the School of Pharmacy of the Northwestern University in 1911, Dr. Oscar Oldberg, then dean of that School of Pharmacy, made the above title the topic of his address. His exhortation to pharmacists was "I venture to call upon all Pharmacists present to begin here and now a vigorous campaign to compel

full recognition of the great service rendered to mankind by the Pharmacist.

Such a campaign is urgently necessary and should have been begun years ago.

The public is ignorant of the fact that the Pharmacist is the sole agent to whom must be entrusted the enforcement of so much of the public health laws as relates to the drugs used in the practice of medicine. Let us try to remove that ignorance.

It is our right and duty to demand respect for the service rendered by our craft."

While much has been accomplished in this campaign of education, the need for its continuance along the lines then advocated by Dr. Oldberg is still very apparent. The opposition to the organization of a pharmaceutical corps in the United States Army demonstrates how little progress has actually been made in the education of the public to the actual relation of pharmacy to medicine and the importance of the service of the pharmacist to mankind.

We are pleased to note that many of the medical journals are now giving consideration to the importance of pharmacy as a collateral branch of medicine, and are advocating the establishment of the army pharmaceutical corps as proposed by the Edmonds Bill, H. R. 5531, so as to relieve the medical officers of the army of a vast amount of non-medical work that has been imposed upon them. The following editorial from the *Pennsylvania Medical Journal*, June, 1918, is a current evidence of this.

RECOGNITION OF PHARMACY.

"Practically every state of the Union has a law which provides that those who furnish drugs to the public shall be qualified for this professional work. In our Army the hospital steward, who dispenses the medicines ordered by the physician for the sick soldier, is detailed from the ranks without requirement of pharmaceutical training.

To remedy this defect and thus increase the efficiency of the Medical Department of the Army, it is proposed to establish a Pharmaceutical Corps. As is the case with the Dental Corps, the Sanitary Corps and the Ambulance Corps, this corps is to be under the command of the Surgeon-General of the Army.

To provide for this recognition of pharmacy, Representative Edmonds of Pennsylvania last July introduced into the House of Rep-

representatives a bill to increase the efficiency of the Army, to provide a Pharmaceutical Corps in that department, and to improve the status and efficiency of the pharmacists of the Army. The bill provides for the establishment of a Pharmaceutical Corps to be composed of a pharmacist director, with rank of major, five deputy pharmacist directors, with the rank of captain, and such number of pharmacists, with rank of lieutenant, and of pharmacist apprentices, as may be needed for the service. The bill delegates to the Pharmaceutical Corps the following duties: To procure by purchase or manufacture all supplies of medicines, drugs, chemicals, pharmaceutical apparatus, and hospital and surgical dressings necessary for the Medical Department of the Army; to determine the quality and purity of such supplies; to have charge of the medical supply depots of the Army and the storage and safeguarding of such supplies; to provide for the issuance and distribution of such supplies and the dispensing of medicines in the various hospitals, dispensaries, infirmaries, trains and camps of the Army; to properly care for, regulate the dispensing and to systematically account for all spirituous liquors and habit-forming drugs purchased for the department; to procure by purchase or manufacture such drugs, chemicals, reagents, tests, and biologic products as are used in the laboratories and the medical and surgical practice of the department for the purpose of diagnosis, prophylaxis, or treatment; to account for all moneys received from sales of medical supplies, in accordance with the provisions of the Army regulations or disposed of by order of competent authority; to inspect the department's stores and supplies of drugs, medicines, hospital dressings, reagents, tests and biologic products and determine their deterioration and fitness for use; to coöperate with the other branches of the department in rendering first aid and wound dressing and in the making of diagnostic and chemical tests; to establish and maintain a systematic course of study and training, including the advances made in medicine, pharmacy, and sciences allied thereto, to be pursued by the members of the Army Pharmaceutical Corps who are seeking promotion in the Corps.

It goes without saying that the efficiency of the Medical Department will be increased if trained and experienced pharmacists purchase (or manufacture), test and dispense the drugs selected and prescribed by the medical men. Also, though the pharmacist is not trained to render medical aid nor, except in isolated instances, to

do chemical or bacteriologic work, his familiarity with drugs should make him of considerable assistance 'in rendering first aid in wound treatment and the making of diagnostic and chemical tests.' The provision 'to establish and maintain a systematic course of study,' for those seeking promotion, follows the example set by the Army in establishing the Army Medical School, of the Navy in establishing the Naval Medical School and of the United States Public Health Service in providing courses of instruction to the men in the service and should do much to elevate the status of pharmacy.

Altogether the establishment of a Pharmaceutical Corps, through the enactment of the Edmonds Bill or some similar measure, should make for greater efficiency in the Medical Department of the Army. Further, the commercial training of the pharmacist should also make for economy. Thus we feel confident that the director general of the Pharmaceutical Corps would strongly protest against the purchase of the proprietary acetanilid mixture 'Ammonol,' which was included among the medicines in the 'List of Staple Medical and Surgical Supplies,' selected by the Committee on Standardization appointed by the Council of National Defense."

That the public-spirited citizens and business interests of the country are likewise beginning to recognize the important position that pharmacists fill in the organization of society and that the professional services of pharmacists are demanded alike for the soldier and the civilian has also been shown by the following Resolution Adopted by the International Convention of Rotary Clubs recently held at Kansas City.

WHEREAS, We believe that one of the most important duties devolving upon the governmental authorities is to provide to the utmost for the conservation of the lives and health of the American soldiers, who, sacrificnig the comforts of home, are jeopardizing their all for the principles for which the nation is contending, and as our loved ones and, as the soldiers of our country, they are certainly entitled to the very best medical and surgical skill and to expert pharmaceutical service. It is deplorable that in the United States Army medicines are continuously dispensed by those who are unfitted for such duty and who lack a systematic education in the knowledge of drugs and the art of compounding medicines.

WHEREAS, While in civil life each state protects its citizens from incompetent practice, and by law provides for the required expe-

rience, education, examination and licensure of those entrusted with the dispensing of medicines, nevertheless the military authorities of the nation ignore the necessity for a like protection for the soldiers and permit potent, and even the most toxic, drugs to be dispensed by incompetent men without any pharmaceutical experience or education. To continue such practice is to continue to invite calamities and to perpetually expose those in the military service to untoward accidents and untimely deaths.

WHEREAS, It is regrettable that the United States with its progressive spirit and commanding position and its enormous resources should in this respect be found lagging and to have a medical department of the army not fully abreast with medical departments of the armies of other nations. In the armies of France, Germany, Austria, Japan, Italy, Spain, Belgium, Holland, Switzerland, Norway, Sweden, and in the colonial armies of Australia and Canada, there are organized pharmaceutical corps with recognized commissions and responsibilities aiding ably the medical officers in safeguarding the troops in these armies. The United States, that can well afford to give to the men in her military service the best, should not do less than these other nations; yet we have, at present, no pharmaceutical corps in either the army or navy.

Therefore, It is Resolved by the Ninth Annual Convention of the International Association of Rotary Clubs, that the establishment of a pharmaceutical corps in the United States Army as proposed by Bill H. R. No. 5531, introduced by Hon. George W. Edmonds of Philadelphia, and now pending before the Committee on Military Affairs of the House of Representatives, be endorsed. We urge that the medical department of the army be speedily reorganized to permit of this needed additional safeguard to our soldiers, and to guarantee to the men in the military service the same efficient pharmaceutical service that the States assure in civil life and that is now so generally vouchsafed to the armies of most of the other nations.

G. M. B.

THE COLLECTION OF SPHAGNUM MOSS.

Sphagnum moss is being extensively collected in England and her colonies for use as a surgical dressing. A number of eminent English surgeons and the army medical service have endorsed its use in the present emergency and one eminent surgeon has declared

that sphagnum dressing is superior to any cotton dressing and that it has better absorbent qualities.

A number of the pharmacists, especially those in certain sections of Scotland, have aided in this service and their botanical knowledge was highly useful in this connection.

It is stated that all that is necessary is to collect the moss, dry it in convenient clean places and pack it in bags. Sphagnum moss grows so extensively in the marshes, bogs and wet places throughout a very large portion of the United States that its value as a surgical dressing or packing and for other war purposes where cotton, oakum or similar materials are now being used, should be determined and this problem is well worth the investigation of Red Cross and Army Medical authorities. If its usefulness for such purposes can be established an endless supply is available at a nominal cost and in many localities the pharmacists could very well coöperate in the collection, drying and transportation thereof.

CORIARIA MYRTIFOLIA AS AN ADULTERANT OF MARJORAM.¹

BY GEORGE M. BERINGER, A.M., PH.M.

From time to time, reports have appeared in technical and scientific literature of the detection of the leaves of *Coriaria myrtifolia* L. as an admixture in various foods and drugs. The adulteration of senna with these leaves was recorded on several occasions during the last century. In recent years the United States Department of Agriculture has several times reported that marjoram containing these leaves had been imported.

La Wall² proposed the following method for the separation and estimation of coriaria in marjoram: "by placing a five gramme sample of the suspected drug upon a large sheet of paper and repeatedly shaking and blowing until the lighter particles of marjoram are removed, leaving behind the stems and any sand, dirt, stones, etc., that may be present and the flat, heavier particles of coriaria leaves."

Coriaria myrtifolia L. is one of the characteristic shrubs of the

¹ Presented in abstract at the meeting of the New Jersey Pharmaceutical Association, Spring Lake, N. J., June, 1918.

² Proceedings, Pennsylvania Pharmaceutical Association, 1917, page 241.

Mediterranean flora. Because of the large content of tannin, it has been extensively used at times in the dyeing and tanning industries. Hence the vernacular names commonly applied to the plant, "tannin bush," "leather tree," and "tanner's shrub."

Coriaria myrtifolia has been reported as poisonous to carnivorous animals and the use of the leaves in medicine is negligible. It is stated that all parts of the plant contain the colorless, bitter, crystalline glucoside *coriamyrtin* which is reported as having therapeutic properties resembling in this respect picrotoxin and to be of service in the treatment of blennorrhoea.

The Department of Agriculture has communicated the following rough chemical test for the detection of coriaria leaves in marjoram. "Place about 1 Gm. of the sample in a 6-inch porcelain dish, add 200 Cc. of water and finally about 5 drops of 10 per cent. ferric chloride solution. A light yellowish color of the liquid is produced by pure marjoram, but when coriaria is present the color becomes a decidedly dirty green, the intensity naturally depending upon the amount of coriaria present and the time of standing. The coloration is due to the presence of a large amount of soluble tannin. After standing for a few minutes, the edges of the particles of the coriaria leaves become conspicuously blackened and can be picked out readily."

This proposed test is based upon the well-known reaction of solutions of ferric salts with tannin. Marjoram leaves themselves contain a tannin giving a greenish-black reaction with ferric chloride and many other leaves, such, for example, as those of oak and chestnut, containing notable quantities of tannin would give this reaction equally as well as coriaria leaves, and so this test would have no value for the positive determination of the presence of coriaria leaves.

Recently a sample of marjoram alleged to be adulterated with coriaria was referred to the writer for examination. From this sample a number of small fragments of a foreign leaf were separated. These were quite distinct from the leaves of the marjoram. The fragments showed that the leaf was pale green on both surfaces, without pubescence, and with peculiar wrinkled markings, the texture was thick and the fracture brittle. These fragments were exceedingly small leaf portions, the larger of those it was possible to separate out rarely measuring more than one-eighth of an inch in the longest dimension. So thoroughly had the leaves been broken

up that it was impossible to piece the fragment together so as to form any conception of the size or shape of the leaf and no opinion could be formed even as to the character of the margin.

These fragments being smaller and heavier than the most of the portions of the marjoram, the tendency in the bale and in the sample

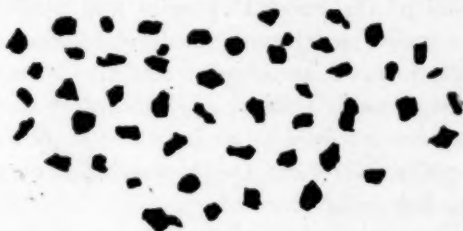


FIG. 1. Fragments of *Coriaria* Leaf, adulterant of Sweet Marjoram.

packages was toward the formation of "pockets," in which there would be an undue proportion of these foreign leaf fragments. Hence the attempt to estimate quantitatively the amount of this admixture was abandoned as the results obtained could not be considered as trustworthy.

An attempt was made to trace this particular lot of sweet marjoram back to the source of collection and to obtain samples of the original collection and likewise, of the plants growing in the fields where collected or adjacent thereto, with the hope of thus determining the character and origin of the admixture. It was learned that the lot had been purchased from a New York importer; that it was part of a shipment from Marseilles, France, in January, 1916; that it had been examined and passed at the port of entry on February 24, 1916. The consignors in Marseilles, responded that "it was quite impossible to furnish the information desired and were very sorry not to be able to be of any assistance in the matter."

A critical examination of a number of trade samples of "Sweet Marjoram" convinces the writer that the descriptions in the works on pharmacognosy and food products and, likewise, the definitions in the foreign pharmacopœias for *Herba Majoranae* must be considered rather as academic utterances than as standards that can be complied with by the commercial marjoram.

The Pharmacopœia Helvetica IV defines *Herba Majoranae* as the leaves and flowers of *Majorana hortensis* Moench, stripped from the stem at the time of flowering.

The Pharmacopœia Austriaca VIII defines *Herba Majoranae* as

Majorana hortensis Moench an annual plant indigenous to southern Europe but now generally cultivated. While the description given is for the whole herb, including the stems and branches, this authority likewise admits the cut or "species" form and the coarsely ground.

Practically all of the current botanies and works on foods and drugs attribute sweet marjoram to the herbaceous annual plant *Origanum majorana* L. Karsten separated this from *Origanum* and reestablished the genus *Majorana* of Tournefort and thus the synonymy became more involved as we have in use by different authors for the same plant *Majorana Origanum* L., *Majorana Majorana* Krst., *Majorana hortensis* Mönch.



FIG. 2. Typical Leaves of Sweet Marjoram, *Majorana Origanum* L.

Although sweet marjoram has been cultivated as a seasoning herb for many centuries, botanists are far from agreed as to its native country. E. M. Holmes³ states: "It is supposed to be a native of Mediterranean countries and has been cultivated as a pot herb from the earliest times, being used for this purpose by the ancient Egyptians. It was introduced into this country from North Africa in A.D. 1573, but is hardly known in a truly wild state in Europe, and its native country must be regarded as doubtful."

Due allowance must be made for the changes effected by cultivation and the efforts of the agriculturists and horticulturists with sweet marjoram that have extended over many years. It is known that in many parts of Europe, the annual plant, by cultivation, has been prolonged to several years of growth. The perennial form of

³ *The Perfumery and Essential Oil Record*, December, 1912.

marjoram has generally been attributed to *Origanum majoranoides* Willd., which admittedly is very closely allied to *O. majorana* L.

Zörnig⁴ gives as a "sophistication of true marjoram, *Origanum Maru* L., indigenous to Crete and Palestine and grown by us in the garden as winter marjoram, which has rounded ovate, thick and white hoary leaves."

To what extent the several above-named species of *Origanum* contribute to the commercial supplies of sweet marjoram or how far cultivation and hybridization has affected the commercial product remain as unsolved problems. In all of the lots of sweet marjoram that I have examined, there have been noted variations in the flower heads and in the leaves present from the descriptions of the type plant. The sample under consideration in the present investigation was no exception. From this was separated a number of small ovate, thick leaves with appressed white pubescence, that could very readily have been attributed to *Origanum Maru* L. (Fig. 3) and certain elongated cylindrical inflorescences that could have been assigned to *Origanum majoranoides* Willd.

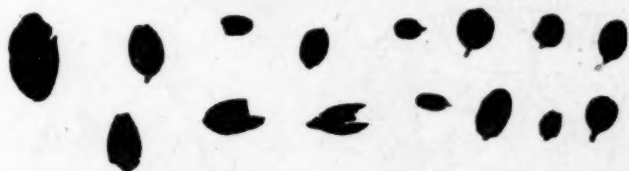


FIG. 3. Leaves of *Labiatae*, with appressed pubescence, occurring with Sweet Marjoram.

Furthermore, an allowable percentage of unavoidable extraneous matter such as grasses and other plants growing with the marjoram and accidentally collected in the harvesting should be officially determined and, likewise, the ash content (varying from 12 to 20 per cent.) should be standardized at not over 15 or 16 per cent.

In a further elaboration of his studies of the marjorams, E. M. Holmes⁵ considers *Origanum Maru* L. as the parent plant and states "one of its forms appears to be the parent of the sweet marjoram so widely cultivated in most civilized countries, but the botanical origin of which has hitherto been very obscure." He traces here the historical records and the etymology of the name Marjoram and concludes "that *Origanum majorana* is probably only a form of

⁴ *Arzneidrogen*, Vol. 1, p. 291.

⁵ *The Perfumery and Essential Oil Record*, March, 1913.

O. Maru L.," and he "regards the *Origanum majoranoides* of Willenow as a form of *O. Maru* with stalked leaves and white flowers." He likewise points out as a significant and curious fact "that in our national herbaria only cultivated specimens are to be found under the name of *Origanum majorana* L."

This all tends to confirm the writer's contention that in any official standard that may be adopted for sweet marjoram, due allowance should be made for the botanical uncertainty and for the variations effected by climatic conditions and by cultivation.

In order to arrive at a definite conclusion as to the botanical source of the foreign leaf fragments admixed with this lot of marjoram, and suspected to be coriaria leaves, the investigation had to be confined to a microscopical study of the structure and a comparison of this with the structure of marjoram and of authentic samples of the leaves of *Coriaria myrtifolia*.

In commercial marjoram many of the leaves are usually broken by the stripping or beating process employed to separate the stems and by the compressing and baling resorted to for transportation.

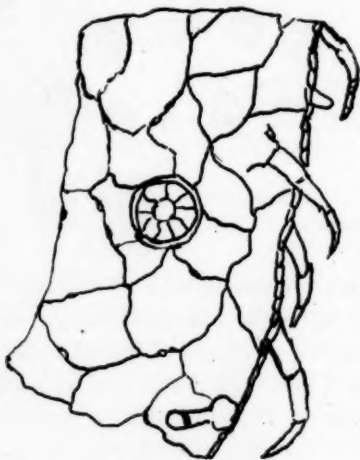


FIG. 4. Upper surface, Sweet Marjoram Leaf.



FIG. 5. Lower surface, Sweet Marjoram Leaf.

Nevertheless, by soaking up a small sample a sufficient supply of leaves is generally obtained to permit the study of size, shape and structure and compliance with type specimens.

The lower stem leaves of marjoram are larger, rounded to ovate, with hairy petioles, the upper become smaller, usually ovate to ovate.

lanceolate, and shorter petiolate, pellucid punctate, midrib prominent, the lateral veins curved unevenly, both surfaces covered with whitish pubescence; bracts ovate to oblong, pubescent.

Under the microscope, the epidermal cells on both surfaces are shown to be strongly sinuate in outline with thickened warty walls, stomata small and more numerous on the lower surface; trichomes on both surfaces abundant and of three distinct types: (1) thin-walled, jointed hairs more or less appressed and bent, (2) stalked hairs with glandular one-cell head, (3) the cup shaped gland with multiple-cell head. Cross section shows that the leaf is bifacial



FIG. 6. Cross Section, Sweet Marjoram Leaf.

with prominent palisade tissue and comparatively narrow loose mesophyll and no crystal cells. The structural characteristics of sweet marjoram leaf are quite distinctive.

Coriaria leaves could not be obtained in the drug trade and, under existing war conditions, it was not possible to obtain samples from correspondents abroad. A small sample of "finely cut leaves of *Coriaria myrtifolia*" supplied by the U. S. Department of Agriculture was procured from Prof. Chas. H. LaWall for comparison. The Department had advised him "that they did not have specimens of the entire leaves nor any information as to where they could be obtained." This sample consisted of small leaf fragments that were very similar to those that had been separated from the marjoram under examination and created the suspicion that they likewise had been obtained by isolation from an adulterated importation. In the absence of more definite information as to their source this sample was not accepted as authentic.

Reliable authentic leaves of the *Coriaria myrtifolia* were, however, obtained from the herbarium of the Academy of Natural

Sciences at Philadelphia and from the Martindale herbarium at the Philadelphia College of Pharmacy and I am especially indebted to the latter collection for material which permitted the arrival at a satisfactory conclusion.

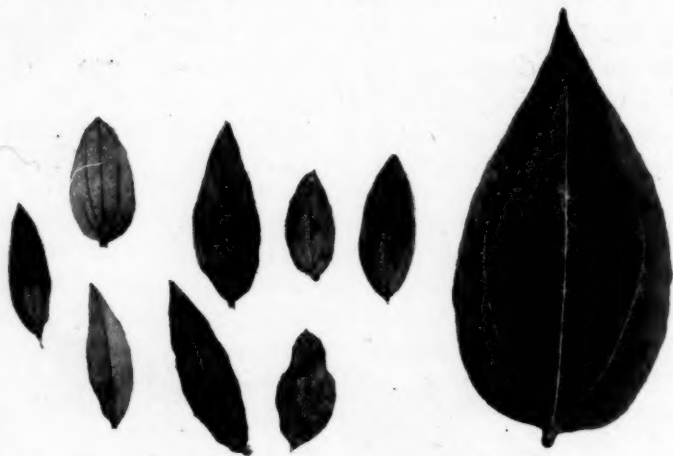


FIG. 7. Leaves of *Coriaria myrtifolia* L. Natural Size. The large leaf is from the specimen *C. angustifolia* referred to in text.

The leaves of *Coriaria myrtifolia* vary from elongated lanceolate to broadly ovate lanceolate or even rhomboid in shape, are glabrous throughout, upper surface bright green, lower pale yellow-green, margin entire. A characteristic is the three prominent veins, the midrib runs to the apex of the leaf and the two lateral veins starting



FIG. 8. Venation of *Coriaria myrtifolia* Leaf; $\times 15$.

from near the base run nearly parallel to the margin and well past the center of the leaf. Examination shows that the venation is not as simple as it appears at first sight; there are several minor lateral veins starting from the midrib and all of the veins divide and spread fairly well through the lamina so that while there is no apparent anastomizing or reticulation of the surface there is a well-marked venation as shown by Figure 8.

Under the microscope, the dermal cells appear polygonal in out-

line, with thickened walls and occasionally distinct pores, with the exception of the stomata and the neighboring cells which are more

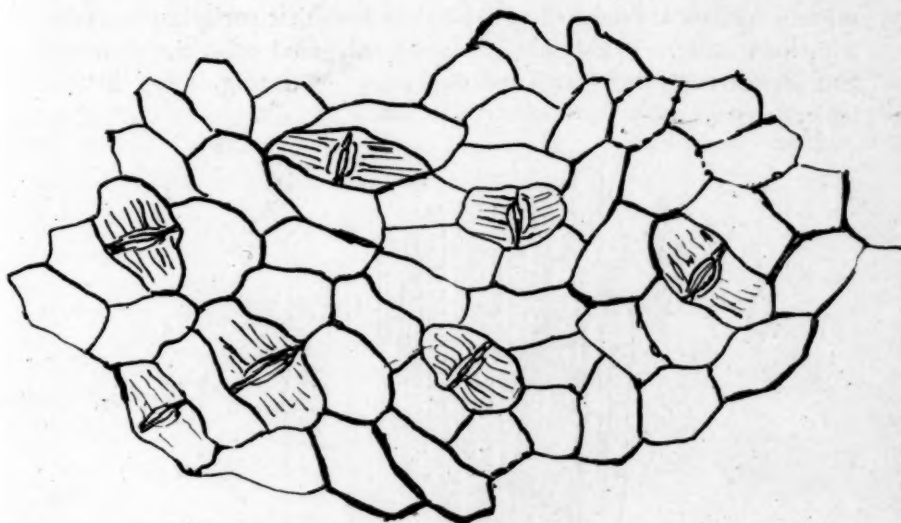


FIG. 9. Stomata and Surface Cells, leaf of *Coriaria myrtifolia*.

or less rounded in outline and the neighbor cells are strongly marked or striped perpendicularly to the stomata. The surface is entirely free from hairs or glands of any kind. The stomata are possibly more numerous on the lower surface. The cross section showed a

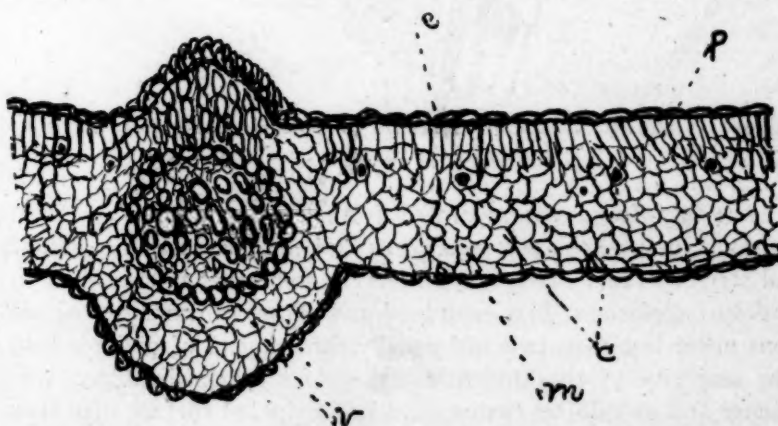


FIG. 10. Cross section leaf of *Coriaria myrtifolia*, $\times 300$. *e*, dermal layer; *c*, oxalate crystals; *m*, mesophyll; *p*, palisade tissue; *v*, vascular tissue of mid rib.

palisade layer beneath the upper epidermal cells of one to three rows deep and beneath this a spongy mesophyll. The upper cells of the mesophyll and the lower cells of the palisade layer contain numerous oxalate crystals. It will be thus seen that coriaria possesses a distinct structure and that the large polygonal cells, the stomata and striped neighbor cells are important as distinguishing histological characters.

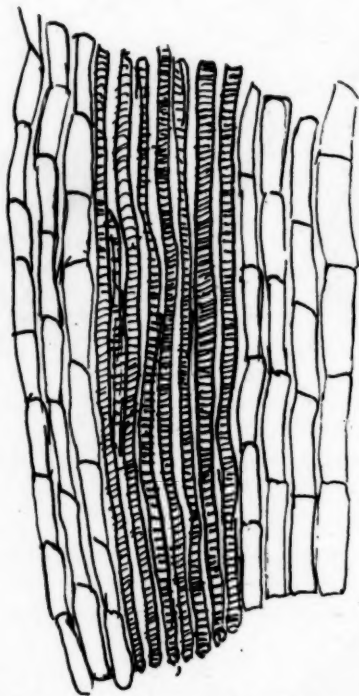


FIG. 11. Longitudinal Section of Midrib of *Coriaria* Leaf; sieve tubes and trachea of the vascular bundle.

The leaf fragments separated from the marjoram showed the glabrous surface, the polygonal cells and the characteristic stomata and stripped cells. They were however somewhat thicker than the leaves of coriaria at first examined and showed in many cross sections never less than two and usually three layers of palisade cells. The majority of the authentic leaves of coriaria examined were thinner and of a softer texture and less wrinkled surface than these fragments and on cross section showed only one or at most two rows of palisade cells.

A specimen discovered in the Martindale herbarium and labeled as "*var. angustifolia*" had thick, broadly ovate to ovate-lanceolate leaves and these had the same wrinkled surface as the fragments and moreover in structure of cross section agreed with these also. This demonstrated not only the variation that occurs in the leaves of *Coriaria myrtifolia* but also permitted a positive conclusion that the leaf fragments separated from the marjoram were portions of the leaves of *Coriaria myrtifolia* so broken up as to destroy any resemblance to their original form.

THE ROMANCE OF THE CHEMICAL ELEMENTS.

THEIR HISTORY AND ETYMOLOGY.

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(Continued from page 492.)

ALCHEMISTIC PERIOD.

In the alchemistic period there were seven known metals, which were ascribed to celestial bodies. They were always enumerated in a fixed order and designated by the astrological symbols. Thus we have:

○	☾	☿	
(1) Sun, gold.	(2) Moon, silver.	(3) Mercurius, mercury.	
♀	♂	♃	♄
(4) Venus, copper.	(5) Mars, iron.	(6) Jupiter, tin.	(7) Saturn, lead.

To those came at a later date antimony with the symbol of the earth, ♂.

The era of alchemy is a very interesting chapter in the history of human knowledge. It was a time when man tried to impress upon nature his petty theories and naturally failed. One can follow step by step the growth of chemical knowledge which finally led to the establishment of physical and chemical laws and taught

mankind that the physical world was governed by unchangeable laws, which man cannot alter. Man's position to the physical world was thus altered, and he became an experimenter and investigator, who could only try to find out those physical laws, and apply them to his welfare. While man failed in the achievement of his theory, that of transformation of the base metals into gold, he acquired a great deal of chemical knowledge, which paved the way to the rapid advancement of science in the eighteenth and nineteenth century. The discoveries during the alchemistic period were always accidental, but some of them of great importance for science.

Bismuth.

Among the elements, discovered by some unknown alchemist, is *bismuth*, which is for the first time mentioned by Basil Valentin in 1459 as *wismut*, and described as a bastard of tin. Paracelsus also speaks of *wissmat* and in the writings of Georgius Agricola we find it as *wissmuth* and in the Latinized form *bisemutum*. According to Koch the name is very probably derived from the Arabic *wiss majat*, which means a metal that easily melts, for the alchemists studied eagerly the Arabic writings and were familiar with Arabic terms. This explanation is more plausible than the following ones. Kluge, *e. g.*, derives it from the name of the oldest bismuth mine, "St. Georgen in der Wiesen" (near Schneeberg), and connects it with an old miner's term, "muten"—to go prospecting, thus indicating the metal found by prospecting "in der Wiesen." Mathesius tries to connect it with the German "wiesenmatte," and its older form, "wesemot"—a cut meadow, which shall in the late autumn present the different colors sometimes observed on the metal. Sanders finally attempts to explain it as "bi-smut"—bei-schmutz, or dirt, as it should be an impurity of other metals. The last explanations are, however, not plausible. Bismuth or *wismuth* has been often confused with other metals, so, *e. g.*, in 1595 Libavius holds it as antimony, in 1675 Lemery thinks it to be zinc, until in 1739 J. H. Pott studied its properties and establishes it as an element.

Zinc.

In the form of alloys *zinc* has been used by the ancients, *e. g.*, Aristotle speaks of a metal of the tribe of the *Mosynoëgy* obtained

by fusing a natural copper-zinc ore aurichalcite, and Pliny mentions that the mineral kadmia (calamine) is used for making brass. The German word for brass = messing is derived from the ancient tribe name, but the origin of zinc is somewhat obscure. Paracelsus mentions it for the first time in 1520, and as he was deeply interested in medicine may have probably derived it from the old high German "zinco," which means "a white spot in the eye," in allusion to the white color of the metal. It may, however, come from the German zinke = prongu, tine, on account of the pronged, crystalline structure.

Phosphorus.

An important discovery was made in 1669 by Brandt, of Hamburg, who, in his alchemistical experiments, distilled evaporated urine with sand, and found a substance which was glowing. This mysterious substance he called *phosphorus*, in allusion to the morning star Venus, which was often termed Lucifer or Phosphorus, the first name from the Latin lux = light and ferre = carry, the latter from the Greek $\phi\omega\varsigma$, phos, = light, and $\phi\omega\phi\omega\varsigma$, phoros, = bring, both indicating the light-bringing medium. Brandt sold his secret of making phosphorus in 1677 to Krafft, who exhibited specimens of the mysterious substance, but one year later Kunkel, and in 1680 Boyle also found out how phosphorus could be prepared. In 1775 Scheele made it from bones and studied phosphoric acid. Schroetter in 1845 discovered a modification of phosphorus—red phosphorus, and Schenck in 1902 made orange-colored phosphorus.

Cobalt.

Ghosts and goblins played always an important rôle in the minds of the medieval man. They were not only in fairy tales, but actual beings, and inhabited different places. One of these goblins was the German "kobold," which was a spirit of the earth and inhabited underground places. So it was natural that the miners came sometimes in touch with him. One of his deeds was to cause the miners to find heavy ores which looked like silver ores, but which produced no silver and were useless. These ores they termed then kobolt, and we find them mentioned in the writings of the alchemists, Basil Valentin and Georgus Agricola. Then G. Brandt examined these ores and isolated in 1733 a new metal which he called *cobalt* after the mineral.

Platinum.

We come now to the time following the discovery of America, when the Spaniards began to explore the New World and to look there for mysterious treasures. Some of the early adventurers noticed in the gold fields of some southern American districts a white metal associated with gold, which looked like silver, but was not silver, and which they called platina, being the diminutive of the Spanish "plata" silver. Antonio de Ulloa travelling in 1735 in Peru refers in his accounts to this *platinum*. In 1741 some of these grains were brought to England by Charles Wood from the gold mines of Choco in Peru, and in 1750 Sir William Watson described it as a new metal.

Nickel.

Manifold were the dangers to the old miners, for they had not only to encounter bad goblins, but even the devil himself. One of these devilish ores was called by the Germans kupfernickel, for it looked like a copper ore, but on roasting it released poisonous arsenic fumes. So the name given to it was *nickel*, meaning the devil (its milder form in German necken = to annoy, to tease, compare also nickname). It was in 1751 that a Swedish chemist, A. F. Cronstedt, examined this koppernickel and isolated a new metal, which he termed nickel from the mineral.

FOUNDING OF CHEMISTRY.

We come now to the founding of the new chemistry, which was accomplished by the discovery of several gaseous elements, *e. g.*, hydrogen, nitrogen and oxygen. During the previous time the "phlogiston" theory had developed, that is, combustion was thought to be the separation of some element, the phlogiston, from the burning substance, for one could see in the smoke and fumes the phlogiston "going off" and leaving the substance. When oxygen was discovered it was thought to be "dephlogisticated air," chlorine was "dephlogisticated muriatic acid," nitrogen was "mephistic air" or "phlogistic air."

Hydrogen.

The first of these gases to be discovered was *hydrogen*, which was isolated in 1766 by H. Cavendish by the action of acids upon

metals, and which he called "inflammable air." Later, in 1781, he showed that by burning of this gas, water was produced and from this fact the name is derived from the Greek ὕδωρ, hydros, = water, and γένναω, gennao, = to produce. There is evidence that the alchemists knew of hydrogen, without examining it closer, for Paracelsus (1493-1541) mentions that a combustible gas is produced by treating certain metals with acids, and in 1700 Lemary recognized knallgas, the explosive mixture of hydrogen and air. Liquid and solid hydrogen was for the first time prepared by Dewar in 1898.

Nitrogen.

In 1772 Rutherford showed that only a part of the air could be used for breathing, and that the remainder could not be used for combustion. This he termed "mephisticated air." Priestley termed it "phlogisticated air," and Cavendish in 1785 produced nitric acid by passing electric sparks through moist air, thus proving that nitric acid can be produced from air. He gave the gas the name *nitrogen*, from niter and gennao, produce, meaning the niter-producing gas (niter = saltpeter or potassium nitrate).

Oxygen.

But the most important of all these discoveries was that of *oxygen*, isolated on the first of August, 1774, by J. Priestley (1733-1804) by heating mercuric oxide. K. W. Scheele (1742-1786), working independently, also isolated in 1775 the gas, which he called "empyrean air," but it was A. L. Lavoisier (1743-1786) who developed the new theory of combustion and termed the gas oxygen, because he found that many of its combustion products were acids, from the Greek ὄξυς, oxy, = sour, and γένναω, gennao, = produce.

Chlorine.

Chlorine was discovered by Scheele in 1774 and called "dephlogisticated muriatic acid." Berthollet in 1784 regarded it as "oxygenized muriatic acid" and in 1809 Sir Henry Davy finally gave it the name chlorine from the Greek χλωρός, chloros, = yellowish green, on account of its color.

Manganese.

The manufacture of glass has been known for a long time; the Egyptians already understood the making of it. Later Byzantium (Constantinople) became the center, and in 1289 the famous glass works of Murano in Venecia were founded. But the raw materials of glass (flint, potash and lime) contained always some traces of iron, which imparted the familiar green color (in bottles) to glass. This green color was destroyed by adding some pyrolusite, a mineral which had already been examined by J. H. Pott, in 1740, who showed that it contained no iron, as was supposed. Scheele in 1775 recognized it as the oxide of a distinct metal which was isolated by J. G. Gahn in 1780 and called *manganese*, from the Greek *μαργάνω*, manganidso, I purify, in allusion to the use of its dioxide in the manufacturing of glass.

Tellurium.

Another mineral which puzzled the alchemists was called "aurum paradoxum," or "metallum problematicum," for it looked like a metal, and did not behave like one. In 1782 Müller von Reichenstein and in 1798 M. H. Klaproth studied this supposed metal, and the latter recognized it as a non-metal and gave it the name *tellurium*, from the Lat. tellus = earth, as it occurs as a mineral.

Tungsten.

Wolfram has been an old German miner's term for a mineral that was "wolfrig"—wolfish, gluttonous in its behavior, for whenever it was melted with tin ores, it looked as if the tin percentage was decreasing. The alchemists gave it the name, for we find in Agricola's writings "spuma lupi" = wolf's stone. In Sweden the mineral was known as *tungsten*, from the Swedish tung = heavy and sten = stone, from which Scheele in 1781 prepared tungstic acid, and in 1783 the brothers d'Elhuyar isolated the metal.

Uranium.

Sir W. Herschel in 1781 discovered a new planet, which was later called uranus from the Greek *οὐρανός*, uranos, = heaven. This discovery naturally attracted great attention and as M. H. Klaproth in 1789 recognized a new metallic oxide, in pitchblende, he gave it

in honor of Herschel the name *uranium*. In 1841 Peligot showed that the supposed metal was in reality the oxide of an element.

Titanium.

Menachin was the name given by William Gregor in 1789 to a new element discovered by him in menachinite (ilmenite). But in 1793 M. H. Klaproth found independently from Gregor in Cornwall a new metal in the mineral rutil, which he termed *titanum*, deriving the name from the Greek halfgods *titanes*, titanes, the children of Uranus and Gae (heaven and earth), in allusion to the element discovered after uranium. The pure metal was very difficult to isolate, but in 1821 Rose prepared a pure titanium oxide and showed that menachin and titanium were identical, while a somewhat impure metal was prepared in 1857 by Wöhler and Sainte-Claire Deville.

Zirconium.

"Jargon de Ceylan" has been known to the French jewellers for a long time as a gem of the hyacinth or jacinth kind. It derived its name from the Hind. *cercars*, Arab. *zargun* = stone, meaning the stone from Ceylon. In a variety of it, zircon, M. H. Klaproth recognized a new element, calling it *zirconium*; the metal itself was in 1805 isolated by Berzelius.

Yttria.

In 1788 Arrhenius found near the Swedish town Ytterby a new mineral, which was later called gadolinite, in honor of the Swedish chemist, Gadolin, who discovered in 1794 a new base in this mineral. This base was in 1799 by A. G. Ekeberg called *yttria*, from its occurrence in the mineral of Ytterby. Later on many new elements, the so-called rare earth metals, have been isolated from this and similar minerals, yttria itself proving to consist of several constituents, which will be seen from Table V.

Beryllium.

From beryl L. N. Vauquelin obtained in 1797 a new oxide and in 1828 A. H. Bussy and Wöhler isolated a new metal which was called *beryllium*, from the Greek name *beryllos* for the gemstone, which was known to the ancients. Sometimes the term *glucinum* is also

used for this element, because some of its compounds have a sweet taste (Greek *glykos* = sweet).

Columbium and Tantalum.

Governor Winthrop of Connecticut found near his house a new mineral which he called columbite, in honor of America. In 1801 C. Hatchett recognized in this mineral a new substance, which he termed *columbium*, and which proved later to be a mixture of columbium and tantalum oxides. In 1802 A. G. Ekeberg isolated from the mineral *yttrotantalit* from Sweden also a new substance, which proved later to be *tantallic acid*. But the character of these new substances was not recognized until in 1844 Rose isolated from a columbite of Bavaria two new elements, which he termed "*niobium*" and "*pelopium*," from the Greek Niobe, the daughter, and Pelops, the son of Tantalus, as it was supposed that these elements were always associated with *tantalum*. R. Hermann also isolated two elements, which he called "*ilmenium*" and "*neptunium*," from the mineral *ilmenite* and the newly discovered planet Neptune. But his elements proved later to be a mixture of columbium and tantalum. The separation of these elements was very difficult, and to-day we recognize columbium (or niobium) and tantalum (or pelopium). The name tantalum was given to it in allusion to the Tantalus in the Greek legend, the son of Zeus, king of Lydia, who was punished by standing in water, with beautiful fruit trees above him. His thirst he could not still, for the water retreated before his mouth, and the fruits were always just out of reach. According to the early ideas about tantalum, it was unable to "satisfy" its thirst for acids, for it could not be neutralized with acids, even by an excess of it. But its isolation and separation was also tantalizing, and its evasive nature justifies the name from more than one standpoint.

Platinum Metals.

The platinum ore, respectively native platinum, was examined by Smithson Tennant and independently by Wollaston in 1804, and each of them discovered two new metals: *osmium* and *iridium* by the former and *palladium* and *rhodium* by the latter. The names are derived from the Greek terms of some of their properties, while palladium is named in honor of the newly discovered asteroid Pallas (see Table VI).

Ceria.

Another new planet was discovered in 1801 by Piazzi of Palermo, which was the first one of the asteroids, and called Ceres; from it the name cerite for a new mineral and *ceria* for a new base found by Klaproth and independently by Berzelius and Hisinger in 1803 has been derived. Like yttria, so ceria proved to consist of several other elements of the rare earth group, whose separation and isolation is seen in Table IV.

Sodium and Potassium.

The salts of *sodium* and *potassium* have been known in very remote times and used in various trades. The Egyptians already distinguished between "ordinary alkali" and "red alkali," the latter being potassium carbonate, which colored the flame purple. In the Orient sodium carbonate (and potassium carbonate) was known as neter or bor, and it was mainly gotten from the alkali lakes of Egypt, about fifty miles from Cairo. In the Old Testament we find (perhaps the first reaction) that nether and vinegar mixed together are effervescing. The Romans imported large amounts of nitrum (sodium carbonate) from Egypt and used it for the manufacturing of soap. From nitrum the modern terms natrium (sodium) and niter (saltpeter) are derived. The term alkali came in use among the alchemists, and is derived from the Arabic article al and kali = ash, for alkali or potash was prepared by burning of seaweeds and other plants. From it kalium (potassium) is derived. The Arabic kali = ash is connected with kalaja = to burn, and is also found in Hebrew kalah = burning. Marggraf in 1758 showed the analytical distinction of sodium and potassium and in 1807 Sir H. Davy succeeded in isolating the metals by electrolysis, thus introducing electric methods into chemistry and laying the foundation for electrochemistry.

Calcium and Magnesium.

Like sodium and potassium, so *calcium* and *magnesium* were first isolated by electrolytical means. Calcium by Davy in 1808, and magnesium in 1830 by Liebig and Bussy, although Davy had tried in vain to prepare it. The compounds of calcium were known in prehistoric time; we have in Latin calx, Greek chalix for lime-

stone and chalk (compare calcareous and the German kalk, Swedish kalck, even the French chaux).

Magnesium sulphate was known as epsom salt to N. Grew in 1695, who prepared it, and magnesium alba was made in 1707 by M. N. Valentin, while in 1755 J. Black showed that magnesium alba and lime were different substances. The name was derived from magnesite, a mineral found near the ancient town of Magnesia (modern Manisa) in Asia Minor.

Between 1800 and 1850 not less than twenty-three elements were discovered or isolated, mainly by the experimental work of Davy, Gay-Lussac, Berzelius, Wöhler and others. It was during this time that the methods of chemistry were worked out and the foundation of the science established. From Table VIII the results of their work can be seen.

The Spectroscope.

The new science was aided in 1860 by the application of spectroscopic methods to analysis, and as a result several new elements were discovered by this method. The first one was *cæsium*, whose presence was detected by the "fathers" of spectroscopy, Robert Bunsen and Kirchhoff, *rubidium* followed right after, then *thallium* by Crookes, *indium* by Richter, *gallium* by Lecoq de Boisbaudran. The names were mostly derived from the Greek words for the color of characteristic lines in the spectrum (see Table III).

The spectroscope was then employed as an aid in the separation of the rare earths, and many "new" elements were found, which proved later not to be so. But some were really new, and are embodied in our present list of elements (see Tables IV and V).

Periodic System.

The rapid discovery of a great many new elements stimulated not only the study of chemistry and made it more popular, but it also enabled the chemist to systemize and compare his results. In every science we can follow the gradual development from collecting facts to systematization. So we find the first attempts of a classification in 1829 as Doebereiner published his "triads," that is, he put always three elements into a group, in which there was a certain relation of their properties (*e. g.*, Li-Na-K; Ca-Sr-Ba; S-Se-Te; etc.). This idea was further developed in 1854 by Crookes, and in 1865 by DeChancourtois. In the same year the

important step of increasing the groups was taken by Newlands in his law of "octaves," grouping eight elements together. Then in 1869 came Mendeleeff and independently Lothar Meyer and announced their periodic system. It is often said, in textbooks and otherwise, that the periodic system was "discovered." But this is misleading, as something that gradually develops with the increasing knowledge of mankind is not "suddenly discovered," but is "gradually attained." But Mendeleeff discovered something, and that was the prediction of two new elements. He thought, presuming the system was correct and assuming there is a unity and persistency in the material world, that some elements were missing, and he calculated from their assumed position the properties they should have and called them, in 1869, *eka-boron* and *eka-silicon*. Six years later *gallium* was discovered by Lecoq de Boisbaudran and its properties proved to be those of *eka-boron*. In 1886, Clemens Winkler found a new constituent in argyrodite of Freiberg and termed it *germanium*, and its properties were identical with those predicted by Mendeleeff, as *eka-silicon*. These predictions could only be made because the elements were near those elements of lower atomic weights, and filled out the table practically complete. To-day we are enabled to fix the end point of the elemental series, viz., the radioactive elements, and thus limit the system to 92 elements.

Noble Gases.

Throughout the modern development of chemistry it has been believed that we know exactly the constitution of air and its percentage of different gases: oxygen, nitrogen, carbon dioxide, water vapor, etc. The announcement of Sir William Ramsay and Lord Rayleigh in 1894 that they had discovered a new gas in the atmosphere, was therefore generally accepted as very doubtful. But there came more, for not only *argon*, but in 1898 *neon*, *krypton*, *xenon*, and later *helium*, were found to be constituents of air. The percentage is very small, and the methods employed for determining it are a triumph of physics. These new gases developed to be elements, although it was at first proposed by some chemists that argon might be only a different form of nitrogen, just like ozone is oxygen gas containing three atoms in the molecule. They were elements, but no compound could be made; all means to produce a chemical reaction with these elements failed. In fact the name argon, from

the Greek term for lazy, indicates its inertness. The difficulty arose how to place these elements in the periodic system, and a "zero" group was added. Now we know that these elements form, so to speak, the "missing link" in the system, for they form the transition from a highly electro-negative group of elements to a highly electro-positive group. From the halogens to the alkali metals. So they became of great theoretical importance in chemistry.

TABLE VII.
The Family Tree of the Noble or Inert Gases.

Year.								Discoverer.
	Air (1,000 liters)							
1772	Nitrogen							Rutherford
1774	Oxygen (209.9 l)							Priestley, Scheele, etc.
1894	Nitrogen (780.3 l)			Argon (9.4 l)				Ramsay and Rayleigh
1895		Helium (.004)						Ramsay, Cleve
1898				Neon .012	Argon 9.4	Krypton .00005	Xenon .000006	Ramsay and Travers
				↓	↓	↓	↓	
Number	8	7	2	10	18	36	54	
Symbol	O	N	He	Ne	Ar	Kr	Xe	
At. W.	16	14	4	20	40	83	130	

N. B. The amount of each gas by volume is given in parenthesis. Thus 1,000 liters of air contain about 0.004 liters of helium, etc.

Radioactive Substances.

Following this epoch-making discovery there came another one of equal, perhaps still greater importance, namely, the radio-active substances. The time was ripe and the stage set for this discovery. It came after physics had settled down and declared that there could no more be anything new in physics, and that the work of the physicist simply consisted in working out the details. Then came the discovery of the X-rays by Professor Röntgen, and with it an entirely new field had been opened up. Everyone began to work with "rays" of some kind or other. Becquerel in Paris studied

especially the rays emitted from uranium salts, and this led to the discovery of *polonium* and *radium* by Professor and Madame Curie in 1898. Then followed a time of great confusion, for everywhere new radioactive substances were discovered. But the mystery was increased when it was found that these bodies disappear. For instance Madame Curie had separated with much care and time a little sample of polonium and sealed it into a small glass, and put it aside. After half a year, when she wanted to use it again, it was gone. That is the glass was there all right, but the polonium had left.

Many experiments have been carried on, and many ingenious devices have been invented and as a result of the new phenomena, such as radioactivity, cathode rays, X-rays, etc., we have been forced to change our conception of an atom. For practical purposes an element still consists of atoms, but these atoms are also built up of still smaller particles, of which the electrons and the alpha-particles (which change into the element helium) have already been isolated. Our atomic theory is still in the process of being created, and the reader is more or less familiar with the tendencies of modern physics (or is it chemistry?).

We have in this way followed the history of the elements, and in Table VIII the reader will find a chronological arrangement. This and the other tables will serve as a reference, for the space of the text permitted the writer to mention only some and not all of the elements. A careful study of these tables will be helpful to understand certain movements in the history of chemistry. For instance how the introduction of electrolysis and the spectroscope resulted in the discovery of some new elements, and how the knowledge of about 60 elements assisted in the formulation of the periodic system, for these 60 elements were the important nucleus of the system. To-day the study of the periodic relationship among the elements will help us to solve our present problem: the constitution of the atom, for we have now with the noble gases a continuous line of elements, while the radioactive elements indicate the end of the line, so that we are entitled to believe our system to be complete.

The romance of the chemical elements is fascinating, and while I am doubtful if I have made the subject interesting to the reader, I will be satisfied if I succeeded in pointing out how knowledge grows, and how, by the labors of our ancestors, we are enabled to lift the veil of the mysteries of nature and apply the natural laws for the welfare of mankind.

TABLE VIII.
Chronological Order of Discovery of the Chemical Elements.

Year.	Name.	Discoverer.	Source.
Prehistoric	Carbon		Native
"	Sulphur		Native
"	Gold		Native
"	Silver		Native
4000 B. C.	Copper	(Egypt)	(Mt. Sinai)
3500 B. C.	Iron		Meteorites
	Lead		
1600 B. C.	Tin	(Chaldea)	
1000 B. C.	Antimony		
300 B. C.	Mercury	Theophrastus	Cinnabar
<i>Alchemistic Period:</i>			
1220	Arsenic	Albertus Magnus	Orpiment
1459	Bismuth	Basil Valentin	
1520	Zinc	Paracelsus	Zincblende
1669	Phosphorus	Brandt	Urine
<i>Beginnings of Chemistry:</i>			
1733	Cobalt	Brand	Cobalt ore
1750	Platinum	Wood, Watson	Platina
1751	Nickel	Cronstedt	Kupfernickel
1758	Sodium	Marggraf	Sodium salts
1758	Potassium	Marggraf	Potassium salts
<i>Founding of Chemistry:</i>			
1766	Hydrogen	Cavendish	Acids
1772	Nitrogen	Rutherford	Air
1774	Oxygen	Priestley	Mercuric oxide
"	Chlorine	Scheele	Muriatic acid
"	Magnese	Scheele	Pyrolusite
"	Barium	Scheele	Baryte
1782	Tellurium	Müller	"Aurum paradoxum"
"	Molybdenum	Hjelm	Molybdenite
1783	Tungsten	d'Elhujar	Scheelite
1787	Strontium	Cruikshank	Strontianite
1789	Zirconium	Klaproth	Zircon
"	Uranium	Klaproth	Pitchblende
"	Titanium	Gregor	Ilmenite
1794	Yttrium	Gadolin	Gadolinite
1797	Chromium	Vauquelin	Crocosite
"	Beryllium	Vauquelin	Beryl
1801	Columbium	Hatchett	Columbite
1802	Tantalum	Ekeberg	Yttrotantalite
1803	Cerium	Klaproth	Cerite
"	Osmium	Tennant	Platinum
1804	Iridium	Tennant	Platinum
"	Palladium	Wollaston	Platinum
"	Rhodium	Wollaston	Platinum
<i>Beginnings of Electrochemistry:</i>			
1808	Calcium	Davy	Lime
"	Magnesium	Davy	Magnesia alba
"	Boron	Davy, Thenard, etc.	Borax
1812	Iodine	Courtois	Sea-kelp
1817	Selenium	Berzelius	Chamberdeposits

TABLE 8.—Continued.

Year.	Name.	Discoverer.	Source.
<i>Beginnings of Electro-chemistry :</i>			
1817.....	Cadmium	Strohmeyer, Her- man	Zincblende
1823.....	Silicon	Berzelius	Flint quartz
1826.....	Bromine	Balard	Sea-water
1827.....	Aluminum	Wöhler	Alum
1828.....	Thorium	Berzelius	Thorite
1830.....	Vanadium	Sefström	Iron slag
1839.....	Lanthanum	Mosander	Cerite
1841.....	(Didymium)	Mosander	Cerite
1843.....	Erbia	Mosander	Cerite
1845.....	Ruthenium	Claus	Platina
<i>Beginnings of Spec-troscopy :</i>			
1860.....	Caesium	Bunsen	Mineral water
1861.....	Rubidium	Bunsen	Mineral water
".....	Thallium	Crookes	Chamber deposits
1863.....	Indium	Reich, Richter	Zincblende
1875.....	Gallium	Lecoq de Boisbau- dran	Zincblende
1878.....	Terbia	Delafontaine	Cerium minerals
".....	Ytterbia	Mariqnac	Cerium minerals
".....	Holmium	Soret	Cerium minerals
".....	Thulium	Cleve	Cerium minerals
1879.....	Samarium	Lecoq de Boisbau- dran	Samarscite
".....	Scandium	Nilson	Cerite
1880.....	Gadolinium	Mariqnac	Samarscite
1886.....	Dysprosium	Lecoq de Boisbau- dran	Holmia
".....	Praseodym	Auer von Welsbach	Didymia
".....	Neodym	Auer von Welsbach	Didymia
".....	Germanium	Winkler	Argyrodite
".....	Fluorine	Moissan	Hydrofluoric acid
<i>Modern Chemistry :</i>			
1894.....	Argon	Ramsay & Rayleigh	Air
1895.....	Helium	Cleve, Ramsay	Cleveite, uranie
1898.....	Neon	Ramsay & Travers	Air
".....	Krypton	Ramsay & Travers	Air
".....	Xenon	Ramsay & Travers	Air
".....	Polonium	Curie	
".....	Radium	Curie, Bemont, Schmidt	Pitchblendè
".....	Actinium	Debiérne, Giesel	Thorium ores
1900.....	Europium	Demarcay	Samarium
1907.....	Lutecium	Urbain	Ytterbium
1913.....	Brevium	Fajans	Uranium
1916.....	Denebium	Eder	Thulium
".....	Dubhium	Eder	Thulium

THE RELATIVE ACTIVITY OF SEPARATED PORTIONS
OF DIGITALIS.

BY E. L. NEWCOMB AND C. H. ROGERS.

In a previous paper a method was presented for the special cleaning of the drug digitalis. The digitalis used for the development of the special cleaning process was prepared from plants of *Digitalis purpurea*, first year's growth, grown in the Medicinal Plant Gardens of the College of Pharmacy of the University of Minnesota. The drug met all U. S. P. IX requirements without the application of the special cleaning process. However, in view of the lack of information concerning the nature of foreign matter which the U. S. P. permits to be present it was deemed wise to carry the process of eliminating this extraneous material just as far as possible and thereby produce a drug with a minimum of what are possibly deleterious substances.

During the special cleaning process the digitalis was separated into four well-defined portions, *i. e.*, (a) select clean drug representing petiole and lamina only, ash 9.284 per cent.; (b) select clean drug with petioles partly removed, ash 8.91 per cent.; and (c) petiole fragments with practically no lamina present, ash 8.76 per cent.; and (d) number 50 fine powder siftings consisting of the hairs of digitalis, inorganic material and very few lamina and petiole portions, ash 56.81 per cent.

As the work of cleaning progressed a number of questions arose which demanded the application of physiologic methods for their solution and this further study, with the results obtained, is herewith presented.

One of the important questions to be determined was the relative activity of the several separated portions. These values were determined by the application of the following well-known methods for the physiological assay of digitalis: (a) Reed and Vanderkleed guinea-pig method, (b) intravenous cat methods. It is not our purpose to discuss in this paper the relative merits of the methods employed although the nature of the work and the results obtained causes us to give preference to the latter.

A five per cent. infusion of the select cleaned digitalis representing petiole and lamina was prepared, and upon assay by the guinea-pig method gave the following results:

TABLE I.

Guinea-pig Assay of Select Cleaned Digitalis—Five Per Cent. Infusion.

Date of Test.	Pig Number.	Weight of Pig.	Dose of Drug in Gm. per 250 Gm. Wt. of Pig.	Dose of Drug in Gm. per Gm. Wt. of Pig.	Actual Dose Given in Mls. of 5% Infusion.	Results.
2-4-18, 12:10 A.M.	3	405	.0875	.00035	2.835	Died 12:43 A.M., 33 min.
2-4-18, 12:15 A.M.	4	390	.0875	.00035	2.73	Died 12:53 A.M., 38 min.
2-3-18, 11:15 P.M.	1	535	.075	.0003	3.21	Died, 2-4-18, 12:52 A.M., 57 min.
2-4-18, 12:05 A.M.	2	500	.075	.0003	3.00	Died 12:05 A.M., 1 hr.
2-4-18, 10:10 P.M.	10	400	.0625	.00025	2.00	Died 11:30 P.M., 1 hr. 20 min.
2-4-18, 10:05 P.M.	9	750	.050	.0002	3.00	Died, 2-5-18, 12:20 A.M., 2 hrs. 15 min.
2-5-18, 2:30 P.M.	16	640	.04375	.000175*	2.24	Died 4:30 P.M., 2 hrs.
2-5-18, 5:15 P.M.	18†	495	.04375	.000175*	1.73	Died 7:20 P.M., 2 hrs. 5 min.
2-15-18, 5:40 P.M.	35	420	.04375	.000175*	1.47	Recovered
2-5-18, 2:20 P.M.	15	630	.0375	.00015	1.89	Died 4:30 P.M., 2 hrs. 10 min.
2-5-18, 5:07 P.M.	17†	390	.0375	.00015	1.17	Survived 36 hrs.
2-15-18, 5:43 P.M.	36	405	.0375	.00015	1.215	Recovered
2-5-18, 6:00 P.M.	19	720	.03125	.000125	1.80	Recovered
2-5-18, 6:05 P.M.	20	575	.025	.00010	1.15	Recovered

A ten per cent. infusion of the petioles separated from the select clean digitalis was made and tested by the guinea-pig method, with the following results:

* M. L. D. is .04375 Gm. of select clean digitalis per 250 Gm. wt. of guinea-pig, or .000175 Gm. per Gm. wt. of pig.

† Infusion prepared from capsule-filling drug, petioles partly removed.

Note: The word "cleaned" as used in the title of this table refers to drug prepared by the special cleaning process, outlined by the authors in a previous paper.

TABLE II.

*Guinea-pig Assay of Petioles Separated from Select Cleaned Digitalis—
Ten Per Cent. Infusion.*

Date and Time of Test.	No. of Pig.	Weight of Pig.	Dose of Drug in Gm. per 250 Gm. Wt. of Pig.	Dose of Drug in Gm. per Gm. Wt. of Pig.	Actual Dose Given in Mls. of 10 % Inf.	Results.
2-4-18, 1:05 A.M.	7	575	.4	.0016	9.2	Died, 2-4-18, 1:45 A.M., 40 min.
2-4-18, 10:30 P.M.	13	335	.3	.0012	4.02	Died, 2-5-18, 12:30 A.M., 2 hrs.
2-4-18, 10:35 P.M.	14	390	.25	.00010	3.9	Died, 2-5-18, 12 M., 13 hrs. 25 min.
3-27-18, 4:15 P.M.	50*	355	.25	.0010	3.55	Died, 3-28-18, 8:25 A.M., 16 hrs. 10 min.
4-18-18, 2:46 A.M.	60*	205	.2375	.00095	1.94	Died, 4-19-18, 12:00 P.M., 33 hrs.
4-18-18, 2:44 A.M.	59*	260	.2375	.00095	2.47	Died, 4-18-18, 9:00 A.M., 6 hrs. 16 min.
4-18-18, 2:41 A.M.	58*	560	.2250	.0009†	5.04	Died, 4-18-18, 9:00 A.M., 6 hrs. 16 min.
4-18-18, 2:38 A.M.	57*	540	.2250	.0009†	4.86	Died, 4-18-18, 9:00 A.M., 6 hrs. 16 min.
4-18-18, 2:35 A.M.	56*	310	.2125	.00085	2.63	Recovered
4-18-18, 2:30 A.M.	55*	320	.2125	.00085	2.72	Recovered
4-18-18, 2:25 A.M.	54*	435	.2	.0008	3.48	Recovered
2-4-18, 1:15 A.M.	8	380	.2	.0008	3.04	Recovered
3-27-18, 4:05 P.M.	45	350	.2	.0008	2.8	Recovered
3-27-18, 4:11 P.M.	49*	375	.2	.0008	3.00	Recovered
3-28-18, 9:35 P.M.	51*	260	.2	.0008	2.08	Recovered
3-27-18, 4:07 P.M.	48*	440	.175	.0007	3.08	Died, 3-27-18, 7:30 P.M., 3 hrs. 23 min.
3-28-18, 9:40 P.M.	52*	475	.175	.0007	3.325	Recovered
3-28-18, 9:45 P.M.	53*	180	.175	.0007	1.26	Recovered

A ten per cent. infusion of the number 50 siftings which ran 56.81 per cent. of ash was prepared and also tested by the guinea-pig method. The results were as follows:

* The 10 per cent. infusion used for these pigs was prepared from petioles rolled between the fingers in order to free them from about 5 per cent. of laminar portions.

† M. L. D. is .225 Gm. of petiole per 250 Gm. wt. of guinea-pig, or .0009 of petiole per Gm. wt. of pig.

TABLE III.

Guinea-pig Assay of No. 50 Dirt Siftings Separated During the Process of Cleaning Digitalis—Ten Per Cent. Infusion.

Date and Time of Test.	No. of Pig.	Weight of Pig.	Dose of Drug in Gm. per 250 Gm. Wt. of Pig.	Dose of Drug in Gm. per Gm. Wt. of Pig.	Actual Dose Given in Mils of 10% Infusion.	Results.
2-4-18, 12:50 A.M.	6	545	.4	.0016	8.72	Died 2-4-18, 9:00 A.M. 8 hrs.
2-4-18, 10:18 P.M.	11	445	.3	.0012	5.34	Died 2-5-18, 4:30 P.M. 18 hrs. 12 min.
2-4-18, 10:25 P.M.	12	370	.25	.0010	3.7	Died 2-5-18, 1:05 P.M. 14 hrs. 40 min.
2-4-18, 12:40 A.M.	5	467	.2*	.0008*	3.736	Died 2-4-18, 11:50 P.M. 33 hrs. 10 min.
3-27-18, 4:20 P.M.	46	375	.175	.0007	2.625	Recovered
3-27-18, 4:25 P.M.	47	355	.15	.0006	2.13	Recovered

According to Reed and Vanderkleed the standard M. L. D. for digitalis is 100 milligrammes of drug per 250 gramme body weight of guinea pig, with a twenty-four-hour limit. Table I shows that the M. L. D. of the select cleaned Minnesota digitalis was 43.75 milligrammes of drug per 250 gramme body weight of animal. In other words, the drug proved to be more than twice as active as required by the arbitrary standard of Reed and Vanderkleed, which is in conformity with results on previous years' crops of Minnesota digitalis when tested by this method. This table also shows that the activity of the drug from which the petioles had been partly removed was practically the same as that of the entire leaf.

Table II clearly indicates that the petioles of digitalis contain a comparatively small amount of the active principles of the drug. The M. L. D. was 225 milligrammes of petioles per 250 gramme body weight of pig. The petioles, therefore, were only about one fifth as active as the cleaned drug, and two fifths as active as the arbitrary standard requirement. Post-mortem examinations showed the hearts to be systolic. The pigs which died exhibited the usual symptoms caused by toxic doses of digitalis. The removed petioles constituted about sixteen per cent. of the total weight of the drug worked with and considering their low activity their removal would only slightly increase the activity of the remaining drug. Theoretically the activity of the drug with petioles partly removed was increased

* M. L. D. is .2 Gm. of No. 50 dirt siftings per 250 Gm. wt. of guinea-pig, or .0008 Gm. per Gm. wt. of guinea-pig.

about four per cent. This increase of activity, however, was not detected by the guinea-pig test.

The presence of only a small amount of the active principles of digitalis in the petioles should be of special interest to students of phyto-chemistry and plant physiology. The tissue of the petiole is chiefly parenchymatous and deficient in the essential elements of photosynthetic activity. On the other hand, the lamina portion of the leaf is composed primarily of cells which are rich in plastid elements, and it is here that the glucosides of digitalis are most abundant. These observations would indicate that the formation of the glucosides of digitalis is closely associated with photosynthetic activity in the leaf. From work now in progress we hope to soon present data concerning the time in the growth of the plant when the glucosides of digitalis first make their appearance.

Table III is especially interesting in that it shows that the number 50 dirt siftings which previously had given a negative chemical reaction for digitalis glucosides possessed marked physiologic properties. The M. L. D. was 200 milligrammes of siftings per 250 gramme body weight of pig. The siftings therefore were only about one fourth as active as the cleaned drug or about one half as active as the standard. Post-mortem examinations revealed the hearts to be systolic. The animals were under more or less constant observation during the period of the test and exhibited symptoms which were not characteristic of digitalis. There was the usual loss of muscular coördination, but this was accompanied by frequent spasms of superexcitation. The spasms were rapid clonic and began in cases of the pigs receiving the larger doses shortly after the administration of the drug. Opisthotonos was pronounced shortly after the spasms began. The rapid contractions and relaxations of the extremities continued at intervals, although the back remained in the arched position until death. Chemical and physiological examinations having demonstrated the presence of only a small amount of digitalis glucosides in the dirt siftings, it is logical to assume that the unusual symptoms manifest were due either to (a) water-soluble constituents of the hairs of digitalis which were present in the siftings in large numbers, or (b) physiologically active principles of the foreign matter present, or (c) a possible combination of effects. In any event it seems to us that these observations afford a strong argument for a more stringent requirement for the careful garbling and thorough cleaning of digitalis leaves.

Table III further demonstrates that the hairs of digitalis are practically devoid of glucosidal principles. This is further substantiated by the fact that a microscopical examination of the fine siftings revealed the characteristic hairs of digitalis as by far the larger portion of all tissue present. Again no qualitative glucosidal test could be obtained from an infusion of this sample.

Tables IV, V, VI give in detail the results of the further examination of the three separated portions, *i. e.*, (*a*) select cleaned digitalis, (*b*) petioles, and (*c*) number 50 dirt siftings. These portions were examined by a modification of the Hatcher Ouabain Method suggested by Hatcher and used by Rowntree and Macht. A M. L. D. of 100 milligrammes of drug per kilogramme of cat, injected intravenously, is generally accepted as the average lethal dose for digitalis. Table IV shows that the cat unit when examined by the method above mentioned is equal to 87.62 milligrammes of select cleaned digitalis leaves, which is 12.38 per cent. more toxic than the average drug. Obviously it is impractical to compare the relative value of the clean digitalis as determined by the guinea pig and cat methods of assay unless the respective standards have a known relative value. It is our opinion that .2 milligrammes of digitalis per gramme of guinea pig is the approximate equivalent of 100 milligrammes per Kg. of cat. Our results show that .175 milligramme of drug per gramme of guinea pig represents the approximate equivalent of 87.62 milligrammes of drug per Kg. of cat. On this basis both methods of assay indicate that the specially cleaned Minnesota digitalis was about 12 per cent. more active than the average sample of digitalis.

A comparison of the results presented in Table IV with those shown in Table V indicates that the petioles were about one fourth as active as the cleaned drug. This is in close accordance with the results obtained by the guinea-pig method.

Table VI relates to the examination of the fine dirt siftings the same as reported upon by the guinea-pig method in Table III. While the results seem to be somewhat discordant, in general they corroborate with Table III. Eliminating cats number one, six, three and seven, the variation is not more than would be expected considering the unusual symptoms exhibited by the guinea pigs, and the exceptional symptoms which were also evidenced in the cats. All the cats exhibited marked peristalsis, defecation taking place in three of the animals. With one exception the cats showed the usual decrease in

TABLE IV.

*Intravenous Cat Method Assay of Select Cleaned Digitalis—
One Per Cent. Infusion.*

Date and Time of Test.	No. of Cat.	Sex Wt. in Kg.	Mils of 1% Inf. Used.	Mils Used per Kg.	Mgs. of Drug per Kg.	Time in Minutes.
4-1-18, 3:54 P.M.	1	2.825 M.	23	8.141	81.41	36
4-1-18, 4:54 P.M.	2	2.675 F.*	19.5	7.289	72.89	30
4-1-18, 7:30 P.M.	3	2.685 M.	26	9.683	96.83	42
4-1-18, 8:35 P.M.	4	2.575 M.	14.1	8.952	89.52	18
4-1-18, 9:12 P.M.	5	2.155 M.	17.4	8.074	80.74	26

* Cat Number 2 was pregnant, nearly full term.

Average M. L. D. excluding cat Number 2, 87.62 Mg. of select cleaned digitalis per Kg. of cat.

TABLE V.

Intravenous Cat Method Assay of Petioles Separated from Select Clean Digitalis—Four Per Cent. Infusion.

Date and Time of Test.	No. of Cat.	Wt. in Kg.	Sex.	Mils of 4% Inf. Required.	Mils Required per Kg.	Mgs. of Drug per Kg.	Time in Minutes.
3-27-18, 9:53 P.M. ...	1	3.05	F.*	18.4	6.03	241.2	25
3-27-18, 11:31 P.M. ...	2	3.25	M.	28.2	8.67	346.8	44
3-28-18, 2:37 P.M. ...	3	1.635	F.	13.9	8.509	340	20
3-28-18, 10:52 A.M. ...	4	2.78	F.	21.8	7.84	313.6	34
4-21-18, 10:31 P.M. ...	5	2.2	F.	17.25	7.84	313.6	21
4-21-18, 11:26 P.M. ...	6	2.48	F.	21.55	8.69	347.6	29

* Cat was nearly full term pregnant.

Average M. L. D. excluding cat No. 1, 332.36 Mg. of petiole per Kg. of cat.

TABLE VI.

Intravenous Cat Method Assay of No. 50 Dirt Siftings Separated During the Process of Cleaning Digitalis—Four Per Cent. Infusion.

Date and Time of Test.	No. of Cat.	Wt. in Kg.	Sex.	Mils of 4% Inf. Used.	Mils Used per Kg.	Mgs. of Drug per Kg.	Time in Minutes.
3-37-18, 5:11 P.M.	1	3.355	F.*	90	26.82	1072	129
3-28-18, 4:13 P.M.	2	2.8	M.	35.15	12.55	502	35
3-29-18, 8:24 P.M.	3	3.8	M.*	66.6	17.52	700.8	121
3-30-18, 5:22 P.M.	4	1.865	M.	27.5	14.74	589.6	34
3-30-18, 7:43 P.M.	5	3.125	F.	37.4	11.96	478.4	63
3-30-18, 9:39 P.M.	6	3.87	F.*	79.4	20.51	820.4	130
3-30-18, 11:36 A.M.	7	2.7	F.*	53.9	19.96	798.4	100
3-31-18, 10:15 P.M.	8	3.325	M.	45.3	13.62	544.8	68
4-1-18, 12:00 M.	9	3.75	M.	40.8	10.88	435.2	70

* Number one and number six were each nearly full term pregnant. Numbers three and seven for some unknown reason were excessively tolerant. Average M. L. D. excluding cat No. 1, cat No. 6, cat No. 3, and cat No. 7, 510 Mg. of No. 50 Dirt siftings per Kg. of Cat.

the pulse rate followed by rapid increase just before death. Post-mortem examinations revealed systolic hearts in each case with the exception of cat number six. All of the cats were unusually irritable and required more or less continual administration of a small amount of ether to keep them quiet.

TABLE VII.
Comparative Toxicity of Separated Portions of Digitalis.

Separated Portion.	Per Cent. Ash.	M. L. D. per 250 Gm. Fig.	Equivalent Cat Unit in Mg. Drug.	Relative Toxicity of Separated Portions by	
				Guinea Pig Method.	Cat Method.
Select clean digitalis	9.284	.04375	87.62	100	100
Petioles	8.76	.225	332.6	19.44	26.3
Number 50 dirt siftings.....	56.81	.200	510	21.8	17.18

The above table gives the comparative activity of select clean digitalis, petioles, and number 50 dirt siftings presented in a form convenient for comparison. From the above observations we believe that all supplies of the drug digitalis should be carefully garbled and thoroughly cleaned before being used.

Summary.—Select clean digitalis produced during the season of 1917 in the Medicinal Plant Garden, College of Pharmacy, University of Minnesota, was more than twice as active when tested physiologically in the form of an infusion by the guinea-pig method as the arbitrary standard earlier proposed by Reed and Vanderkleed.

An infusion of the same drug when assayed by the direct intravenous cat method gave a cat unit of 87.62 milligrammes per Kg. of cat, which is about twelve per cent. more active than the average digitalis when tested by this method.

Relatively the Reed and Vanderkleed standard was found to be much lower than the generally accepted standard for digitalis when assayed by the cat method.

The petioles of digitalis examined contained a comparatively small amount of the active principles of the drug, being between one fourth and one fifth as active as the entire leaf.

The formation of the medicinal principles of the digitalis leaf appears to take place chiefly in those parts of the leaf where photo-synthetic activity is most pronounced.

The number 50 dirt siftings separated from digitalis during

the process of cleaning the drug showed an activity of between one fifth and one sixth that of the clean drug.

The hairs of the digitalis leaf apparently do not contain any or, at most, a relatively small amount of the glucosidal principles of the drug.

Infusions of the dirt siftings produced physiological effects upon guinea pigs and cats not characteristic of digitalis.

COLLEGE OF PHARMACY,
UNIVERSITY OF MINNESOTA.

THE NEXT U. S. P. REVISION.¹

BY E. FULLERTON COOK, PH.M.

The Pharmacopœial decade is rapidly passing and preconvention recommendations for an improved Pharmacopœia are already being heard in appreciable numbers.

A gratifying feature of these comments is the almost entire absence of serious criticism concerning the actual text of the U. S. P. IX. A few errors or desirable changes have been pointed out and are mostly corrected in the later printings of the U. S. P. IX. New conditions, brought about by the war, have altered the status of certain important trade-marked preparations, so that it is possible to now include these in the official list. This will likely be done through the publications of a supplement to the U. S. P. IX, a procedure authorized by the 1910 Convention.

The burden of criticism and suggestion in published comments, however, seems to centre about the question of a more speedy revision and various proposals, to further this end, have been made.

One of these recommendations advises an immediate revision of the book by the present Committee and the presentation to the Convention in 1920 of the completed manuscript for the U. S. P. X. Another plan proposes the establishment of a permanent U. S. P. laboratory, with the financial support of the U. S. P. Board of Trustees, or perhaps the United States Government, for the purpose of working out the problems of revision and for preparing the manuscript, supposedly in less time than heretofore required. Still other ideas concentrate upon an immediate and closer coördination, of the

¹ Read before the Pennsylvania Pharmaceutical Association, June, 1918.

activities of all workers in pharmaceutical fields, with a view of previously working out many of the self-evident problems of the next revision and thus facilitating the next issue of the U. S. P.

All of these proposals are worthy of consideration and adoption at least in part and should be utilized so far as practicable.

The first suggestion, up to a certain point, is desirable, but the conclusion of the revision is impossible since one of the first and most important duties of the new revision committee will be to select the articles to be included in the U. S. P. X. How would it be possible to revise the text until the contents of the book are decided?

The 1910 Committee can work out many problems and tests, under the direction of the chairman of the committee, as has been done effectively in the past, and present their report and recommendations for the use and aid of the new committee. For instance, one of the recommendations of the 1910 Convention was that the average amount of loss, resulting from the grinding of crude drugs, be determined, if possible, for each drug in the U. S. P. and included in a table as a guide to drug millers, but sufficient time was not available for collecting this data and the preparation of such a table for the U. S. P. IX, but such work could now be carried out by the sub-committee and thus be made available for the new Pharmacopœia.

The establishment of a permanent U. S. P. laboratory has been the dream of many workers in Pharmacopœial Revision, but its practicability is questionable. If established on a sufficiently comprehensive scale to be effective, with salaried experts in chemistry, pharmacy, botany, volatile oils, biological standardization, etc., and with the necessary equipment and assistants, the cost becomes prohibitive and we have the public statement of a government laboratory expert that the result of work from such a laboratory would be disappointing if speed is desired or expected.

To stimulate the fullest coöperation of every commercial and private pharmaceutical and chemical laboratory, of the workers in every college of pharmacy, and of every investigator in retail drug stores, is ideal and this help, before the revision starts, and afterwards should be utilized to the fullest extent.

I desire, however, to offer a constructive suggestion for the accomplishment of this much desired speeding up of the next revision. The present organization, or machinery of revision, has

proven its efficiency. The committees have coöperated splendidly and worked smoothly throughout the revision. The general committee of fifty is needed for a full representation of the varied interests of the Pharmacopœia and to provide experts in every field from which to form the sub-committees, while the executive committee, composed of the chairmen of the fifteen sub-committees, is effective in coördinating all interests of the book and in securing decisions, and the one chairman for both general and executive committees affords the necessary centralization and harmony for the organization.

Now the chief cause of delay in revision work is acknowledged to be the time lost through the cumbersome method heretofore in vogue for interchange of opinions and for securing discussions and votes. If this one feature can be corrected, the time necessary for revision can be reduced to reasonable limits and the publication of the new book greatly facilitated.

In the last revision, those who observed the working of the committees, caught a clue to the solution of this problem. It consists in the establishment of a plan for frequent personal conferences during the active period of revision. This was tried to a limited degree, when revising the U. S. P. IX, and it thoroughly proved its value in securing prompt decisions, in clearing up many knotty problems satisfactorily and quickly, and in stimulating all members to intensive work.

The sub-committees may need only one or two such personal meetings, but, to obtain the full benefit from this plan, the executive committee should be authorized to meet at least once a month, during the whole of the active revision, to present reports, conduct discussions, and reach decisions.

This was accomplished heretofore by correspondence, amounting to thousands of pages, and when it is realized that the old plan required four weeks as a minimum, and often six or eight weeks or longer, for each decision of the executive committee, the value of this plan becomes apparent. (Two weeks were always allowed after the proposal of any proposition for its discussion, then came the mailing of the discussion and vote sheet and two more weeks for the votes to come in, before its announcement.)

The tax upon the energies and time of the members of the executive committee, if this meeting plan is adopted, is realized, but, by reducing the actual time of revision to one-third or less of that

formerly required, which seems possible through this change, also by authorizing the payment of expenses and perhaps a small honoraria for the actual time required for the meetings, it is believed that the best workers could be persuaded to give the necessary time to the revision and thereby present the U. S. P. X to the country in record time and also provide a standard for medicine and pharmacy superior to any of its illustrious predecessors.

SOLVENTS FROM SEA WEED. NEW SOURCE OF ACETATE SALTS.

The success which has crowned the efforts of the Hercules Powder Company in the harvesting and fermentation of kelp on the Pacific Coast bids fair to relieve the present serious shortage of acetate of lime.

The story of the venture is one of solid achievement, and one of which American chemical engineers may justly feel proud. At the beginning of the war the Hercules Powder Company was faced with the necessity of developing an entirely new source of supply for acetone in the manufacture of cordite, the British smokeless powder. The company also needed potassium chloride in the manufacture of gunpowder. It has long been recognized that kelp contained potash, and the industry of burning the weed and obtaining the crude salt from the ash has provided for centuries a precarious living for the crofters on the coast of Scotland and elsewhere. It was not widely known, however, that the structure of the kelp plant could be destroyed and the potash released by simple fermentation, and that acetic, propionic, butyric and acids of this series are produced as the products of fermentation.

From the germ of this idea arose the five million dollar plant and marine equipment of kelp harvesters which is now operating on a three-shift, seven-day-week basis near San Diego, in southern California. Potassium chloride of unique purity, acetone, methyl ethyl ketone, acetone oil and iodine are being produced in increasing scale, while from the propionate and butyrate salts the ethyl esters are prepared, and will shortly be on the market.

The potash produced so far is not nearly sufficient to supply the chemical trade, where its sole application is being found on account

of the extreme purity of the salt. Control analyses of the current product show a 96 per cent. grade, with less than 0.4 per cent. of sulphates, the remaining impurity being principally sodium chloride. The acetone and ketones produced by retorting the acetate salts are being used almost entirely in the manufacture of smokeless powder and aeroplane dopes under British contracts, thus releasing an equivalent amount of acetate of lime for industrial users. The solvents produced from the propionate and butyrate salts are something new in the solvent field, and by superseding amyl acetate, etc., in many directions, will still further ease the present acetate of lime shortage.

COLORIMETRIC DETERMINATION OF REACTION OF BACTERIOLOGIC MEDIUMS AND OTHER FLUIDS.¹

BY GEORGE D. BARNETT, M.D.,

PASSED ASSISTANT SURGEON, U. S. NAVAL RESERVE FORCE,

AND

HERBERT S. CHAPMAN, M.D.,

ASSISTANT SURGEON, U. S. NAVY, SAN FRANCISCO.

The colorimetric methods in common use for determining and adjusting the reaction of bacteriologic mediums and other fluids involve the use of standard solutions of known hydrogen ion concentration. A variety of such solutions has been described, and they are readily prepared by any one having a moderate chemical equipment and ability. Just now, however, many men with comparatively little chemical training are confronted with problems of this nature, and the method here described has therefore been devised to accomplish a fairly accurate determination of hydrogen ion concentration without the necessity of preparing standard solutions or of depending on those prepared by others. We are here concerned only with reactions lying between 7.0 and 8.0, and only phenolsulphonaphthalein has been used as an indicator. Other indicators and other ranges of acidity will be investigated later.

In this method use is made of the principle of superimposing the two extreme colors of the indicator, as used by Clark and Lubs,²

¹ From the Journal of the American Medical Association, April 13, 1918.

² Clark and Lubs, *Jour. Bacteriol.*, 1917, 2, 109, 191.

following Salm,³ in determining the so-called half-transformation points of indicators. Within the range of its transition from red to yellow, we may regard the observed color of a phenolsulphonephthalein solution as composed of a definite amount of red plus a definite amount of yellow, and such a color may be exactly duplicated by superimposing the extreme red and the extreme yellow of the indicator in proper concentrations. Thus, if to one test tube we add 5 Cc. of dilute acid, and to another similar tube 5 Cc. of dilute alkali, and to each add 5 drops of phenolsulphonephthalein solution, a bright yellow will be produced in the first tube and a bright red in the other. But if we look toward the light through both tubes, a color will be observed that is half way between the yellow and the red. In fact, it will be identical with the color produced by 10 drops of the phenolsulphonephthalein solution in 5 Cc. of a standard solution having a pH 7.9. This is the half-transformation point, and is a definite constant for this indicator. But if instead of using equal amounts of indicator in each of the two tubes we vary the partition of the 10 drops of indicator between them, then by superimposing each pair and viewing them by transmitted light, a series of colors will be produced which will cover the range of usefulness of the indicator; and once such a series is "calibrated" against solutions of known hydrogen-ion concentration, it may be used as a standard series for the determination of unknown reactions.

Results obtained by such a procedure in the case of phenolsulphonephthalein, comparison being made with phosphate solutions prepared according to Sorensen,⁴ are as shown in the accompanying table.

RESULTS WITH PHENOLSULPHONEPHTHALEIN.

Acid tubes, phenolphthalein solution, drops.	Alkali tubes, phenolsulphonephthalein solution, drops.	pH.
9	1	6.9
8	2	7.2
7	3	7.5
6	4	7.7
5	5	7.9
4	6	8.1

OUTLINE OF METHOD.—*Apparatus and Chemicals Required.*—1. Clean test tubes. These must be of approximately the same diam-

³ Salm, *Ztschr. f. phys. Chem.*, 1906, 57, 471.

⁴ Sorensen and Palitzsch, *Biochem. Ztschr.*, 1910, 24, 387.

eter. An equal volume of water is measured into a number of tubes, and fifteen or twenty are selected for use in which the water stands at about the same level.

2. A 5 Cc. pipette.
3. A medicine dropper drawn out to a fairly fine point.
4. A burette.
5. An indicator solution. A convenient solution (0.01 per cent.) of phenolsulphonephthalein is prepared by diluting 1 Cc. of the usual solution used for kidney function tests (1 Cc.=6 Mg.) to 60 Cc. with distilled water. No accuracy is necessary, provided the same solution is used throughout.

6. Roughly normal and twentieth normal sodium hydroxide.

7. Hydrochloric or sulphuric acid.

PREPARATION OF STANDARD COLOR SERIES.—Twelve test tubes are placed in two rows of six. Into each tube of one row 5 Cc. of dilute alkali are placed. (The twentieth-normal sodium hydroxide may be used, or any solution sufficiently alkaline to bring out the maximum red color of the indicators.) Into each tube of the other row, 5 Cc. of very dilute acid are placed. (One drop of concentrated hydrochloric or sulphuric acid to 100 Cc. of distilled water is sufficiently strong. Strong acid is to be avoided in the case of phenolsulphonephthalein, on account of its secondary color change.) Into the six tubes, 9, 8, 7, 6, 5 and 4 drops, respectively, of indicator are placed. Into the six corresponding alkali tubes, 1, 2, 3, 4, 5 and 6 drops of indicator are placed. If the dropper is held vertically, the drops will be practically of a size. Each pair of tubes thus contain 10 drops of indicator between them, and the series of six pairs, when viewed by transmitted light, will correspond to pH values of 6.9, 7.2, 7.5, 7.7, 7.9, and 8.1 (as in the table) when compared with 5 Cc. volumes of any solution containing 10 drops of the same indicator solution. In order to determine the hydrogen ion concentration of an unknown solution whose reaction lies within this range, 5 Cc. of it are placed in a test tube, 10 drops of indicator are added, and its color is compared with those of the six pairs of tubes. The use of a second tube containing distilled water to form a pair with the unknown is to be recommended, but does not appear to affect the results appreciably. The color series prepared in this manner is as accurate as that yielded by standard phosphate or other solutions when used in a similar apparatus, and can be prepared anywhere in a few minutes without the use of graduated ap-

paratus or accurate quantitative solutions of any kind. As noted by Clark and Lubs, the use of pairs of test tubes is a device which is "optically very imperfect, but it works very well."

TITRATION OF MEDIUMS.—One Cc. of medium to be titrated is added to 4 Cc. of distilled water in a test tube. Ten drops of indicator are added, the color is compared with the color standards if it is desired to determine the initial reaction, and titration to the desired hydrogen ion concentration with twentieth-normal sodium hydroxide is performed. Fifty times the amount used will represent the amount of normal sodium hydroxide to be added to 1 liter of medium. If in carrying out the titration sufficient sodium hydroxide solution is added so that the indicator color is appreciably diluted, the end-point tubes of the comparator should be filled to a similar volume before the final comparison is made. If desired, in comparing colors, use may be made of the block described by Hurwitz, Meyer and Ostenberg,⁵ though practically it has not been found to increase the accuracy appreciably. This is a wooden block in which two pairs of adjacent holes have been drilled to receive two pairs of test tubes. The holes are connected by slits so that each pair may be viewed by transmitted light. In this procedure one pair of holes would contain the acid-alkali pair chosen for an end-point, and the other the diluted mediums and a tube of distilled water. Compensation for colored fluids can usually be accomplished according to the principle introduced by Walpole,⁶ by using in one row of the color standard series 5 Cc. amounts of the fluid made acid or alkaline.

COLLOIDAL METALS.¹

BY THOMAS STEPHENSON, F.R.S., Edinburgh.

During the last decade considerable attention has been devoted to the peculiar catalytic action of the metals in colloidal solution, and the application of this action to therapeutics. The nature and properties of colloidal solutions have long been known, but the assumption by metallic substances of the colloidal state is a comparatively recent discovery. It is a good many years since colloid silver was

⁵ Hurwitz, Meyer and Ostenberg, *Bull. Johns Hopkins Hosp.*, 1916, 27, 16.

⁶ Walpole, *Biochem. Jour.*, 1910-1911, 5, 207.

¹ From the *Prescriber*, June, 1918.

first prepared, but its therapeutic application dates back only to 1896, when, under the name of *collargol*, a colloidal preparation of silver was introduced by Cr  d   as an antiseptic. This substance, which occurs in small black scales having a metallic lustre, forms with water an opaque solution, which has all the properties of a colloid. Although a colloid, however, collargol is not really a colloidal metal, but it is generally considered to be a combination of an acid silver molecule with ammonia, i. e., collargolate of ammonia. Somewhat later, Trillet succeeded in preparing oxydases of certain metals by precipitating solutions of metallic salts with an alkali in presence of albumin, forming a kind of colloidal solution of the metals.

Still later, Bredig produced the solutions known by his name. These are true colloidal solutions of metals, and are produced by passing an electric spark through pure water between electrodes of the metal to be dissolved. The electric current diffuses a minute quantity of the metal throughout the liquid—the metal, in effect, becomes volatilized in the liquid. The resulting solution in every case is a dichroic liquid, transparent to transmitted light and opaque to reflected light. Suspended particles cannot be detected by ordinary methods, and the solution in all respects obeys the rules laid down for colloidal substances. The metal is in a state of very minute subdivision, and the particles possess that vibratory motion known as “Brownian movement.” It is to this movement and to the minuteness of the metallic corpuscles that the catalytic action of Bredig’s liquids is due. Different metals have been used, but it has been found that the nature of the metal is immaterial, the catalytic action of the liquid being due to the physical condition of the metal, and not to the metal itself.

Introduced into the system, these solutions produce remarkable physiological effects, effects that have been shown to be due entirely to the physical state of the metal, and are probably connected in some way with its electric condition. Their use in therapeutics is thus indicated.

With the object of arriving at some definite knowledge of the therapeutic value of these preparations, Robin and Bardet started in 1901 an extended series of trials, chemical, biological, and clinical, with these preparations. The oxydases of Trillet were found to be unsuitable for use in medicine; their powers of oxidation were unmistakable, but owing to their alkaline nature they produced necrosis in the tissues when injected, and had therefore to be aban-

done. The solutions of Bredig, as described above, were found to be eminently suitable for therapeutic use, and a long and careful series of clinical trials were made with these with good results in such cases as pneumonia. One of the chief effects of injection of these solutions was intensified leucocytosis.

As has already been stated, this action appears to be due to the fineness of the metallic particles, and to their vibratory movement, and it has been demonstrated that, should microscopic examination show these particles to have become agglutinated from any cause, their therapeutic activity diminishes in direct proportion to such agglutination.

The only difficulty, but a very important one, which at first attended the employment in medicine of these liquids was their instability, the particles having a natural tendency to agglutination. The usual methods of preservation appeared to be useless. Sterilization by heat caused the particles to agglutinate, with consequent loss of activity, and the same result followed the addition of a foreign substance, such as sodium chloride. Moreover, when injected into the blood, the salts of the blood serum at once caused this agglutination and nullified any therapeutic action such solutions might have.

For several years, therefore, the colloidal metals, while they had their advocates in France, were regarded by British practitioners more as a therapeutic curiosity. Possibly in their country of origin, where their freshness might be confidently relied on, they found some application, but the instability and consequent unreliability of Bredig's solutions placed them beyond the region of practice therapeutics.

Later, however, a method was found of overcoming this instability. This depends on the curious fact that an unstable colloid may be rendered stable by the addition of a small proportion of another colloid. On this principle these metallic solutions may be preserved and isotonized for therapeutic use.

Under the name of *collosols* an English firm has produced a series of colloidal solutions of metals that appears to meet all requirements. Their stability is maintained by the presence of an organic colloid, and their composition and physical condition remain unaltered when sodium chloride is added or when the solution is sterilized by boiling.

DETECTION AND ESTIMATION OF SMALL QUANTITIES OF HYDROGEN CYANIDE.¹

BY P. LAVIALLE and L. VARENNE.

The authors recommend the following method as more sensitive and exact than any previous modification of the ferric thiocyanate method: The solution of alkali cyanide contained in a very small beaker is treated with a solution of calcium polysulphide, drop by drop, until it is distinctly yellow. The reagent is made by washing 20 grms. of lime until free from chlorides, mixing with 100 Cc. water, and passing a brisk stream of hydrogen sulphide through the milk of lime fifteen minutes; the liquor is filtered from the excess of lime, 5 grms. of washed, powdered, roll sulphur added, and the mixture heated on the water-bath for fifteen minutes. After treatment in the cold with this reagent for fifteen minutes the beaker containing the suspected liquid is placed on a boiling-water bath and evaporated to dryness, adding a drop of the polysulphide reagent from time to time if the color shows signs of disappearing. There can then be no loss of cyanogen at this stage. The residue is taken up in 5 Cc. cold water and acidified with 5 drops of dilute (1:5) sulphuric acid. Sulphur and calcium sulphate separate. Calcium carbonate is added gradually as long as there is effervescence, and then in excess to facilitate separation of sulphur by filtration. The filtered liquid is evaporated to dryness and taken up in 1, 0.5, or 0.25 Cc. water, and the solution acidified with 4, 2, or 1 drop of dilute (1:5) sulphuric acid. The proportion of acid is important: the concentration must be sufficient to prevent the formation of red ferric sulphite, which would interfere with the test; and yet insufficient to hinder the production of ferric thiocyanate. The use of smaller quantities of water than 1 Cc. makes it possible to detect smaller quantities of hydrogen cyanide. Ferric sulphate solution (5 per cent.) is now added, drop by drop, until there is no longer any increase in color intensity. The method will detect 0.01 mgrm. or even less of hydrogen cyanide.

The quantitative modification of the test requires all the reagents to be halogen free. It depends on the addition of very dilute stand-

¹ *J. Pharm. Chim.*, 1918 (VII), 17, 97-102. From the *Analyst* for April, 1918.

ard (N/100 or N/500) silver sulphate solution to the ferric thiocyanate until the color is discharged; 1 Cc. N/100 $\text{Ag}_2\text{SO}_4 = 1$ Cc. N/100 HCN. In default of halogen-free reagents one can make two tests, using measured double quantities of all reagents in the second. Another way of surmounting the difficulty is to make two tests up to the formation of the ferric thiocyanate, then to titrate one with silver solution as described, and finally to titrate back with N/100 or N/500 ammonium thiocyanate solution until the color matches that of the solution which has not been titrated, but which has been diluted with distilled water to preserve equality of bulk between the two solutions. As little as 0.01 mgrm. of hydrogen cyanide can be estimated within 5 per cent.

Occasionally difficulty is caused by the separation of calcium sulphate and a trace of carbonate during the last evaporation. When this happens, it is best to filter the solution through a plug of cotton before evaporation is complete. The filtrate and washings are then evaporated to dryness, and no further trouble is experienced.

CAMPHOR SITUATION IN JAPAN.¹

COMMERCIAL ATTACHE F. R. RUTTER, TOKYO.

Interviews with manufacturers of celluloid in Tokyo indicate that the supply of camphor is restricted. Camphor is allotted to these manufacturers in the proportion of their purchases some years ago. One of the largest factories in the country is compelled to work at half capacity because for some years it was engaged in manufacturing munitions for Russia and consequently has a small apportionment of camphor. While camphor is sold by the monopoly at 120 yen per 100 kin, it could easily bring 160 yen per 100 kin if sold in the open market.

The demand for camphor in Japan as well as in the United States has increased enormously, and undoubtedly the government intends to encourage the exportation of refined rather than crude camphor.

¹ From *Commerce Reports*, June 10, 1918.

CULTIVATION OF BUCHU PLANT IN SOUTH AFRICA.¹

VICE CONSUL SAMUEL W. HONAKER, JOHANNESBURG.

Although the buchu plant is said to be indigenous to South Africa its culture has been neglected in recent years. However, as late as 1908, 243,742 pounds of leaves were exported. The high price now prevailing is again stimulating interest in this plant to some extent, as the importance of meeting the demand is fully realized.

Probably one of the most accurate accounts of the cultivation of the buchu plant in South Africa is that by Mr. G. R. Van Wielligh, who, in the *Agricultural Journal* of the Union of South Africa for July, 1913, said in part:

The buchu is a hardy perennial and evergreen shrub belonging to the rue family of plants. The leaves of the buchu, to which the value of the plant is due, are opposite or scattered and are flat and dotted with oil glands, and the margins are glandular, serrate, or, in some cases, almost entirely revolute. When touched or dry the leaves emit a strong aromatic odor, which is due to a volatile oil contained in the glands. This oil is greenish in color when pressed out of the cells and when left to dry upon the leaves forms a camphor-like substance.

THREE SPECIES USED FOR MEDICINAL PURPOSES.—There are three species of the plant used in medicine. While containing the same essential oil and camphor, they differ in the shape, appearance, and color of the leaves.

The kloof buchu (*Barosma serratifolia*) grows in a soil somewhat moist, but not wet. Its average height is 4 feet, but it sometimes grows as high as 10 feet. It thrives in kloofs (ravines), among shrubs and granite rocks and in the shade of trees, and is also to be found in altitudes varying from 500 to 1,000 feet above sea level. A black, sandy loam, containing plenty of decayed vegetable matter, is said to be favorable to its growth. The leaves of this species are dark green, resembling somewhat those of the orange tree, to which it is also similar, in that glands are shown in the lamina of the leaves.

Another species, the mountain buchu (*Barosma betulina*), is

¹ From *Commerce Reports*, June 11, 1918.

probably the most valuable, as it contains the greatest number of oil glands in its smaller, light green leaves. It is more compact and dwarfed than the kloof buchu. It grows from 3 to 4 feet in height and is often found on mountain slopes at an altitude of 1,000 to 2,000 feet above sea level. A red, sandy loam, or red sandstone and quartzite, is said to be favorable to its growth.

The third species (*Barosma crenulata*) has larger leaves than the others. These leaves are 1 inch to 1½ inches in length and are of a smooth, leathery texture; they are ovate-oblong in shape, with serrate or granular margins. The oil glands are visible on both sides of the leaf. However, this species of the buchu is not so widely distributed and is consequently not so well known.

The buchu does not thrive in every soil. In its native state it is not found in earth having limestone as one of its component parts, nor in brackish or sandy soil and stiff clay. On the other hand, a black or red sandy loam, according to the species, impregnated with decayed vegetable matter, facilitates its culture. However, good results are said to be obtained when the plant is cultivated on sandy loam, properly drained and deeply dug, but not irrigated by brackish streams.

METHOD OF CULTIVATION.—Plants can be grown from seeds or cuttings. In case the former method is used, the sowing generally takes place before the weather becomes cold. Boxes and beds are used for that purpose. Boxes are most often filled with a compost of vegetable mold and sand in equal parts, in which the seeds are buried at a depth of about one half inch. They are then generally placed in the shade in a warm place and kept moist. After a few weeks have elapsed, the seeds spring up and the boxes may then be shifted to receive the morning sun. As a rule, all the protection that is required is from sharp frosts and cutting winds, but the soil should be kept moderately moist and free from weeds.

If beds are used they should be dug very deep, and some of the soil should be removed and replaced by a vegetable mold and sandy loam. Sometimes boards are placed on the edges of the beds, or stones or sod are piled around them from 12 to 13 inches in height. The beds are generally covered with branches to shut off most of the light, as too much exposure to the rays of the sun at first often causes damage. As the seedlings appear more light is allowed, but they should not be exposed to a baking sun to any great degree.

For the purpose of transplantation, which usually takes place when

the atmosphere is not too dry or scorching, the ground is usually trenched or plowed to a depth of 2 feet to induce deep rooting. As a rule, the plants should be 5 feet apart in each direction, leaving ample room for the cultivator to pass between the rows. It is the general opinion that the best time to plant is when growth is dormant. In case it does not rain during this period it is customary to irrigate the ground.

After planting is completed no special care is taken other than to weed and rake the soil, so as to conserve the moisture. Raking should be done lightly in order not to disturb the roots, which, although spreading in all directions, are not firmly anchored in the ground as compared with most other shrubs. However, by deep trenching the roots are induced to penetrate the soil more deeply.

PHILADELPHIA COLLEGE OF PHARMACY.

MINUTES OF THE QUARTERLY MEETING.

The quarterly meeting of the Philadelphia College of Pharmacy was held in the Library, June 24, 1918, at 4 P.M. The President, Howard B. French, presiding.

The minutes of the annual meeting held March 25, 1918, were read and approved. The minutes of the Board of Trustees for March, April and May were read by the Registrar, J. S. Beetem, and approved.

The report of the Committee on Membership was read by Professor F. P. Stroup. The recent special effort to increase the membership has been very successful, 117 had already been elected to active membership and 69 to associate membership, with a number more now under consideration. It was expected that some follow-up work during the summer would bring in a further number of applicants for membership.

The Committee on Necrology presented a supplemental report being a memoir of the late James L. Bispham, who was a member of the college for sixty-two years. (See *AMERICAN JOURNAL OF PHARMACY*, June, 1918, page 470.)

A verbal report for the delegates to the New Jersey Pharmaceutical Association was made by the Chairman, Professor J. W.

Sturmer. The meeting was held at Spring Lake, New Jersey, June 18-20. Five members of the Faculty of the College and two members of the Board of Trustees were present. Several members of the Faculty read papers. This meeting was a very interesting one, but not so largely attended as the recent meetings of this Association.

The resignation of Miss Katherine E. Nagle, Librarian, was presented to take effect June 25, as she had accepted a government position. A letter from President French to Miss Nagle was read, regretting the severance of association with the College as Librarian. On motion, a leave of absence for three months, without salary, was granted the Librarian.

President French read a communication to President Wilson sent by the Alumni Association under date of June 11, 1918, relative to the formation of a Pharmaceutical Corps in the Army, asking the President to support the legislation now pending to that end. The receipt of the communication had been acknowledged by Mr. Tumulty, the Secretary to the President.

Mr. French read a circular letter that had been given him from the War Department addressed to all collegiate institutions regarding some of the draft exemptions and a continuation of study by the students in educational institutions. After remarks and explanation the subject was referred to the Committee on National Defence appointed by the Board of Trustees.

The President made the following appointments: Delegates to the meeting of the American Pharmaceutical Association, at Chicago, August 12, 1918, Charles H. LaWall, Chairman, E. F. Cook, Louis Gershenfeld, C. B. Lowe, F. X. Moerk, F. P. Stroup, John K. Thum, H. W. Youngken; Committee on Necrology, C. B. Lowe, E. M. Boring, C. A. Weidemann; Committee on Nominations, C. B. Lowe, C. S. French, E. F. Cook, F. E. Stewart, C. A. Weidemann.

C. A. WEIDEMANN, M.D.,

Secretary.

ABSTRACTS FROM THE MINUTES OF THE BOARD OF TRUSTEES.

March 5, 1918.—Committee on Library reported that the Library had been used during the month by 565 persons. Several gifts had been received but no purchases made. 8,150 books were catalogued and cards filed to date.

Committee on Instruction submitted an important report recom-

mending the inauguration of *four Special Spring Courses*, the object of which was to fit students for service in the Army. The committee submitted the draft of their recommendations, as follows:

The first a laboratory course in bacteriology especially devoted to the consideration of the bacteriology of infectious diseases, open to graduates in Medicine and to others who already have received the necessary training in general bacteriology.

The second a laboratory course in clinical and sanitary analysis. This course to be open to graduates in pharmacy and others who have already received the necessary training in qualitative and quantitative chemical analysis.

The third a laboratory course in the microscopy of food and drugs for graduates in pharmacy and others who have received preliminary training in botany and vegetable histology.

The fourth a course in first-aid and bandaging for pharmacists and others qualified to profit by the instruction.

A committee of three was appointed to attend the hearing of the Edmonds' Bill on March 19, 1918, at Washington, D. C.

Professor Charles H. LaWall and Professor E. Fullerton Cook were unanimously elected professor of theory and practice of pharmacy and professor of operative pharmacy and director of the pharmaceutical laboratory respectively.

Communications were read from Mr. Henry S. Wellcome and the University of Havana relative to the death of Professor Remington.

Communications were also read from Professor Cook and Mr. Otto Raubenheimer expressing their appreciation of the honor conferred upon them in being elected to receive the degree of Master in Pharmacy.

The Committee on Membership reported favorably upon the application of William R. Keeney for Active Membership and Edward Kraus for Associate Membership. A ballot was taken and they were unanimously elected.

April 2, 1918.—A communication was received from the secretary of the College reporting the results of the election of officers and trustees.

George M. Beringer was reelected chairman of the board, Walter A. Rumsey, vice-chairman, and Jacob S. Beetem, registrar, for the ensuing year.

The Chair announced the Standing Committees for the year.

Committee on Library presented no report but the chairman stated that the public library would be glad to receive books for the war libraries and suggested that we make a donation of duplicate books. On motion, the committee was authorized to select such duplicate books they deemed of interest and present the same; also to keep a record of the books given.

Committee on Museum and Herbarium reported progress.

In this connection, Mr. French said he thought the time had come for the Property Committee to request that a new inventory of each department be taken and a record made of what belonged to the College and what to the professors. This suggestion met with general approval and after Professor Sadtler had said that it was his intention to present to the College his collection, Mr. Cliffe moved that in the future a gift to the College should be so marked and if a loan, this should be marked as such with the name of the owner upon same. This was seconded and ordered.

Mr. Beringer said that several large packing boxes were in the College containing his herbarium and now that arrangements were being made for making a new inventory of college property, he desired to present his collection to the College. On motion of Mr. French, the thanks of the College were extended to Mr. Beringer for his valuable gift.

Professor Sturmer reported on the matter of spring courses. Following a trip to Washington, Professor Sturmer said that Major Russell—before whom the matter was laid, was very glad to know that the Philadelphia College of Pharmacy intended giving such a course, but regretted he could not be of assistance in sending students as there were not enough men to spare to fill the assignments to the War College and to the Rockefeller Institute. He would, however, be glad to have a list of the men who finish such courses at the College as these men would be considered candidates for admission to intensive training with the view to assignments as bacteriologists in the Sanitary Corps in which capacity they could attain a commissioned rank. Major Russell further stated that the demand for bacteriologists in the Army was urgent and that large numbers of men trained in this branch would be given the opportunity to earn commissions.

A communication was read from Professor Cook recommending William C. Marshall as assistant in the Pharmaceutical Laboratory for the balance of the term. Approved.

Committee on Examinations reported that Emil Albert Wepfer and Norman C. Braker had furnished satisfactory evidence of four years' practical experience and that they be declared graduates and granted a diploma (Ph.G.) at the next commencement. It was so ordered.

Special Diploma Committee reported that diplomas were needed for the Phar.D. degree and that some changes in the wording was necessary. Approved.

Mr. French read a communication from the State Department of Education, Albany, N. Y., dated March 29, 1918, as follows:

"I have pleasure in advising you that the Board of Regents, at their meeting held March 28, formally registered the Philadelphia College of Pharmacy as an approved School of Pharmacy.

Yours very truly,

(Signed) AUGUSTUS S. DOWNING,
Assistant Commissioner."

Mr. Cliffe moved that the Special Committee on New York matters be discharged with the thanks of the board for their long, arduous and very successful labors. So ordered.

Mr. French read a letter from Mrs. Wm. E. Lee, Secretary W. O. N. A. R. D., relative to granting scholarships to women students and thus encouraging them. The subject was fully discussed, when on motion the Committee on Scholarships was authorized to convey to Mrs. Lee the sentiments of the board.

Prof. Charles H. LaWall verbally expressed his appreciation of his election to the Chair of Theory and Practice of Pharmacy.

A communication was read from Prof. E. Fullerton Cook, expressing his appreciation of the honor conferred by his election to a full professorship.

A formal statement was also read from Professor Cook giving to the College, apparatus, etc., in the Pharmaceutical Laboratory, bequeathed to him by the late Prof. Remington. This was accepted with the thanks of the board.

The request of Henry Morris, P.D., Class of 1911, that his name on diploma be changed from Morris Hamowitz to Henry Morris in accordance with the decree issued by the Probate Court, State of Michigan, was on motion granted.

One application for Life Membership, seventy-seven applications for Active Membership and forty-one applications for Asso-

ciate membership were read and referred to the Committee on Membership.

May 7, 1918.—*Committee on Library* reported that a number of gifts had been received and several purchases made. There has been a total of 9,342 books accessioned and shelf-listed and 8,504 books catalogued to date. The Library was used by 635 persons during the month.

Committee on Property reported the absence of the janitor owing to a sudden attack which necessitated his removal to the hospital.

Committee on Museum and Herbarium reported progress and expressed appreciation of the valuable assistance of Prof. Youngken.

Committee on Instruction reported that they had given further consideration to the subject of post-graduate courses and to the annual reports of the various departments of the faculty. The committee had been impressed with the necessity for continually reviewing and advancing the requirements of the technical chemistry course for which a certificate of proficiency in chemistry is awarded.

The committee has outlined additional courses of instruction; several of which they recommend should become a part of the required tuition of the technical and chemical courses. These recommendations were taken up seriatim and after discussion the following recommendations were adopted:

1. That a course in applied bacteriology covering a period of not less than 90 hours be given to the technical chemistry students.
2. That a course in technical microscopy, as required instruction, covering a period of not less than 120 hours be given.
3. That there be outlined an optional elementary course covering a period of 60 hours as preparatory to the technical microscopy course for those students who have not the required preliminary knowledge in botany and histology.
4. That an optional laboratory course in physiologic testing be outlined.
5. In addition to the laboratory course outlined for post-graduate students in the technical chemistry course, that the lectures on industrial chemistry and chemical control be made a compulsory part of the course, and that special lectures be given for a period of not less than 30 hours. In addition they shall be required to take the general chemical lectures given the first and second year pharmacy students.
6. That there be assigned on the roster for students in the tech-

nical chemistry course recitation periods and that each student be required to attend.

7. A course in chemical engineering, as outlined by Frank X. Moerk, as part of instruction for students in the technical chemistry course.

8. That instruction in foreign literature as now outlined for special students be changed to read: Instruction in Foreign and Domestic Current Chemical and Pharmaceutical Literature.

The Committee on Instruction stated that the report from the various members of the Faculty have been eminently satisfactory and very few changes in the course are necessary. The conferences held by the Faculty have resulted in coördinating the work of the various departments and will, therefore, be continued.

The recommendation of Prof. Cook referred to in the annual address of the President, namely, that members of the board actively engaged in the drug business be asked to hold a conference annually with the instructors in the various departments to assist in making the course thoroughly practical, meets with the approval of the committee.

Prof. Youngken reported that the present instructor had resigned with the close of the college session and requested that he be given authority to select an assistant.

The committee recommends that Prof. Heber W. Youngken be elected professor of botany and pharmacognosy. The committee also stated that during the absence of Dr. Roddy in military service that the work of the Department of Bacteriology and Hygiene had been carried on by Louis Gershenfeld and recommend that he be given the title of assistant professor of the Department of Bacteriology and Hygiene.

Propositions for additional prizes have been submitted to the committee by Professors LaWall, Sturmer, Cook and Youngken, Instructor Griffith and the Estate of Joseph P. Remington, the exact conditions for these awards will be published in the announcement.

The various recommendations of the committee, after discussion, were approved, excepting that relating to the election of professor of botany and pharmacognosy, which according to the by-laws was laid over for one month.

Mr. Cliffe, for the Committee on Special Diplomas, reported the wording on the diploma for the degree of Ph.C. After discussion, the report was adopted.

A communication from Miss Elizabeth Ottinger, offering a prize of twenty-five dollars in memory of her father, James J. Ottinger, was read; also a letter from Prof. LaWall relative to same. The offer of Miss Ottinger was accepted with the thanks of the Board.

A communication was read from Prof. Gershenfeld covering the Liberty Loan subscriptions as raised by the students amounting to \$12,000.

May 27, 1918.—Adjourned meeting.

Mr. French introduced each one present to Mr. Henry S. Wellcome, Class 1874, of London, England, who remained as a guest for a while and before leaving expressed his appreciation of the work the Philadelphia College of Pharmacy was doing in maintaining the highest standard in the profession and also for what his early training in the institution had done for him.

The Committee on Examinations reported the results of the recent examinations and presented the names of those entitled to the various degrees: thirteen for the degree of Doctor in Pharmacy (P.D.) who matriculated in 1915 or at a prior date; six Pharmaceutical Chemists for the degree of Doctor of Pharmacy (P.D.); seventy-five for the degree of Graduate in Pharmacy (Ph.G.). All the above were elected to receive the degrees.

Thirteen of those who have completed the examination and will receive the degree of Ph.G. upon reaching their majority.

Twenty-six who had passed all examinations and will receive the degree of Ph.G. when the requirements as to age and experience have been met.

Three for the degree of Doctor in Pharmacy (Phar.D.).

The committee then presented the names of those to whom prizes were to be awarded.

The committee also reported that Clarence H. Henderson had finished his work in the Food and Drug Course; Leo J. McCarriston had finished his work in Analytical Chemistry; Bernard Kane and Harry Wishnefky had finished their work in Industrial Chemistry and were, therefore, entitled to certificates. On motion, certificates were granted them.

The name of Miss Bessie C. M. Fox, Class of 1917, was also presented and as she had completed full four years' experience was granted the degree of Graduate in Pharmacy.

The names of three applicants for the degree of Master in Pharmacy (Ph.M.) in course was received and action on same was deferred until the next meeting.

Prof. Sturmer presented the names of Henry Reuby Abrams and Simon Green as being entitled to certificates for special work, which were, on motion, granted.

A list of forty-two applicants for Active Membership and twenty-seven for Associate Membership was read and referred to the Committee on Membership.

The list of seventy-eight applicants for Active Membership and forty-one for Associate Membership, presented at the last meeting, having been favorable reported on by the Committee on Membership, was balloted for and unanimously elected.

The Committee on By-Laws presented a number of alterations and amendments to the By-Laws but action was deferred until the next meeting.



The number of stars in the Service Flag of The Philadelphia College of Pharmacy is constantly increasing and now the number of the Gold Stars, indicating those who have sacrificed their lives on the altar of liberty in service to their country and to humanity, is becoming conspicuous and these will ever be silent tributes to their valor and fame.

The following are those who have recently been added to this list of those who have "gone on":

GEORGE PAUL SHEPERDSON.—Private 1st class, Hospital Unit No. 20, University of Pennsylvania. A special student at the P. C. P. during 1912–1913. Died May 4, 1918, in France of scarlet fever. For many years Mr. Sheperdson was in the employ of Rees C. Roberts, of Ambler, Pa., and for a time was a detail man for the Keasby & Mattison Company.

ENSIGN GEORGE B. EVANS, Jr.—A graduate of Hill School and of Cornell University. Was a student at the P. C. P. during 1915–1916 and part of the course of the following year. When the United States entered the war, he enlisted in the Naval Reserves and was assigned to the air forces, in which service he soon won his commission.

He was killed at Miami, Florida, May 31, 1918 (aged 25 years), by the fall of his aëroplane into the bay. He was the son of George B. Evans, Sr., class of 1880 P. C. P., and now a trustee of the College and a prominent merchant and member of the Union League.

ALLEN K. HARTMAN, P.D. 1912.—A native of Akron, Pa., employed formerly in the drug business in Lancaster, Pa. He enlisted in the Army in December, 1917, died of pneumonia in France, March 10, 1918, only a few days after landing. Aged 28 years.

GUY W. SHOWERS.—A graduate of the class of 1916. He was a native of Harrisburg, Pa., and was a graduate of the Technical High School in that city and was for a time in the employ of E. Z. Gross. Later he conducted a private bacteriological laboratory and made analyses for the local physicians. He served as a member of Ambulance Corps No. 12 and died from injuries received when the ambulance he was helping to unload was bombed by a German aëroplane. He passed away on May 29, 1918, in France at the age of 23 years.

THE FORTY-FIRST ANNUAL MEETING OF THE PENNSYLVANIA PHARMACEUTICAL ASSOCIATION.

Considering the fact that shortage of help and wartime conditions made it impossible for many druggists to attend their State conventions this year, the forty-first annual meeting of The Pennsylvania Pharmaceutical Association held at Wilkes-Barre, June 25 to 28, was highly successful in accomplishments.

Six sessions of the meeting were held at the Hotel Sterling, Wilkes-Barre, and two sessions at the Hotel Oneonta, Harvey's Lake, 16 miles outside of the convention city limits.

Mr. Croll Keller, Chairman of the Executive Committee, read the report of that committee, in which the suggestion was made that consideration be given to the matter of aiding members of the Association who have been called to the colors, in disposing of their business or in conducting it during their absence.

The Committee also recommended that action be taken on the suggested legislation for the control of venereal diseases, and this matter be referred to a committee of three, including the Secretary, for the preparation of a definite plan of action and suitable resolutions for adoption at a later session of the meeting.

Secretary Robert P. Fischelis read his annual report, reviewing the work of his office for the year. A condensed style of makeup was suggested for the 1918 proceedings, and this was approved by the Executive Committee.

The most important work of the Secretary's office during the year, next to publication of Proceedings, was the launching of *The Pennsylvania Pharmacist* on the journalistic sea. This is a quarterly publication intended to keep the members informed of the activities of the Association during the period between meetings. Three issues have been published, each one containing a leading article written for newspaper publicity purposes. These articles were widely reprinted in newspapers and other journals. The June issue of *The Pennsylvania Pharmacist* contained the full convention announcement and programme, thus saving the expense of mailing a separate announcement to the members.

The report of the Secretary was accepted with an expression of appreciation for the work that had been done in making *The Pennsylvania Pharmacist* a reality.

At the second session, Dr. F. E. Stewart read the report of the Committee on Patents and Trade-marks. This report covered the subject thoroughly and contained some very important recommendations for the guidance of all those interested in the revision of our patent laws. It was referred to the National Research Council at Washington and the Secretary was instructed to send copies of it to other interested associations. The report was discussed by Professor LaWall and Mr. J. W. England.

The address of President Knoepfel contained many valuable recommendations. In part he said: "Our nation is at war and it is my positive conviction that history will concede that ours was a just cause, that we held high ideals, and our ambitions were most worthy. This mighty struggle has produced many problems for all branches of pharmacy. The colleges find their students enlisting or being drafted, and few new ones coming to replace them. The manufacturer finds it impossible to obtain all the supplies needed; many items being off the market. The wholesaler, because of the demands of the government on the manufacturer and because of transportation difficulties, is unable to keep up stock; and the retailer suffers from all these causes and many others. However, there is cheerful acquiescence, on the part of all in submitting to any hardships which the war has entailed. We must win this war; and to this end we are willing to sacrifice everything we have, if it be necessary. Our business, our properties, even our lives.

It is only common sense to declare that there should be no injustice in the division of the burdens. If they are heavier on our profession than we think proper, it is our privilege and duty to protest."

The following are some of his recommendations:

That the general principle underlying legislation for curtailing the sale of venereal disease nostrums be approved and that the Legislative Committee be directed to coöperate with the Government to secure legislation that will be wise and just in its restrictions of the sale of nostrums and treatments for diseases of this character.

That the Association voice its approval of the objects of the National Pharmaceutical Service Association and coöperate with this organization to bring about a better condition for pharmacists in the Army.

That the Legislative Committee be instructed to coöperate with

other associations in an endeavor to have the State Mercantile License Law repealed.

That the action of any publisher who refuses to accept mail order advertising be endorsed.

That affiliation with the National Association of Retail Druggists and the payment of annual dues of \$25.00 be continued.

That the Association endorse the movement inaugurated for the purpose of giving druggists shorter working hours.

That Congressman George W. Edmonds be elected an honorary member for his earnest efforts to secure government recognition for pharmacists.

That *The Pennsylvania Pharmacist* be continued in its present form and that expense be curtailed in other directions, if necessary, in order to continue its publication.

Dr. E. G. Eberle then presented a paper entitled "Loyalty to the Country and to Pharmacy," which was received with much enthusiasm.

Professor J. W. Sturmer then read a paper entitled "The Acid Test," in which he cautioned against lowering the standards for registration of pharmacists in the State as a wartime measure. He pointed out that lowering the bars at this time would have its effect for years to come, because pharmacists once licensed could not have their licenses revoked and the State might suffer at the hands of incompetents for a long time in the future if the educational standards were lowered now.

The following additional papers were presented at the several sessions:

"The Value of the Microscope in the Drug Store," by Professor Heber W. Youngken.

"Some Thoughts on Salesmanship as Applied to the Retail Drug Store," by Edward T. Hahn.

"An Efficient and Profitable Toilet Lotion," by Chas. R. Rhodes.

"Wanted, the Old-fashioned Pharmacist," by J. W. England.

"Aspirin Tablets," by Robert C. White.

"An Opportunity to Conserve Fats, with Special Reference to Zinc Oxide Ointment," by Edward T. Hahn and Robert P. Fischelis.

"Some Observations on the Dissolving of Zinc Chloride and Several Suggested Solvents," by Mr. and Mrs. J. C. Peacock.

"Laboratory Notes," by George E'we, the latter paper being read by title.

"Hot Cocoa," by Chas. H. LaWall.

"War-time Topics for the Pharmacist," by Robert P. Fischelis.

"The U. S. P. Revision," by E. Fullerton Cook.

"A New and Novel Method of Determining the Amount of Methyl Alcohol in Mixtures of Methyl and Ethyl Alcohol," by William G. Toplis.

The following papers were read by title:

"Organotherapy," by J. Atlee Dean.

"Which is More Profitable a Cash or Credit Business for the Retail Druggist," by Harold J. LaWall.

"Do You Want to be Classed as a Retail Liquor Dealer?" by B. E. Pritchard.

"Normal Salt Solution," by Louis Gershenfeld.

"If the Druggist's Landlord Raised His Rent, Would He Be Justified in Accusing the Landlord of Profiteering?" by Franklin M. Apple.

"Notes on the Action of Oxygen-bearing Compounds Upon Flavoring Oils," by Ivor Griffith.

"The Therapy of Heavy Magnesium Carbonate and Reports on Its Use as a Cathartic," by St. Clair Ransford-Gay.

Immediately after the reading of the paper on Conservation of Fats the Secretary brought up for discussion the matter of conservation of drugs and the revision of formulas containing alcohol, sugar and glycerine as proposed by Mr. F. A. Upsher Smith and others. After due consideration of the subject Mr. Hunsberger moved that it was the sense of the Pennsylvania Pharmaceutical Association that present formulas in the U. S. P. and N. F. remain unaltered unless the revision committees of these respective works deemed such changes necessary.

The following resolutions on the Edmonds Bill were adopted:

We recommend that the following resolutions proposed by the War Defense Committee be approved by the Association and that copies be forwarded by the Secretary, to President Wilson, Secretary of War Baker, Surgeon-General Gorgas, Honorable S. Hubert Dent, and Representative George W. Edmonds:

Resolved, That this Association hereby pledges itself anew to the cause of justice and liberty and its resources in fullest measure, that early and complete victory may rest upon our arms, and,

Resolved, That, through our concern, lest the health of our troops when sick or injured be endangered by the present lack of

proper pharmaceutical service in the Army, we earnestly urge the immediate passage by Congress of the Edmonds Bill (H. R. 5531) creating a Pharmaceutical Corps similar to that now in the French Army.

Resolved, That we urge upon Congress the vital importance of this Bill, not only because it will insure the safe dispensing of medicines in the Army, a condition which does not now obtain, but also because thereby the medical units will be provided with a large number of trained assistants or laboratory technicians, who can also aid in enforcing sanitary regulations, and in carrying out the innumerable activities upon which the health and lives of our armies depend. This class of men require years of special training for such service and are now extensively used in the army for non-pharmaceutical work.

The Nominating Committee presented the following list of nominees:

- For President, Chas. R. Rhodes, of Hyndman.
- For First Vice-President, Ambrose Hunsberger, of Philadelphia.
- For Second Vice-President, James F. Kane, of Pittston.
- For Secretary, Robert P. Fischelis, of Philadelphia.
- For Treasurer, F. H. E. Gleim, of Lebanon.
- For Assistant Secretary, Louis Saalbach, of Pittsburgh.
- Member of the Executive Committee for three years: William H. Knoepfel, Scranton.
- Local Secretary, C. Clyston Jones, Easton.

CORRESPONDENCE.

UNIVERSITY OF CHICAGO,
CHICAGO, ILLINOIS, July 15, 1918.

TO THE EDITOR:

It is important that pharmacists should be familiar with the official names for synthetic drugs so far adopted by the Federal Trade Commission. These are:

Arsphenamine for salvarsan, diarsenol and arsenobenzol, etc.

Neogarsphenamine for neosalvarsan, neodiarsenol and novarsenobenzol, etc.

Barbital for veronal.

Barbital-sodium for medinal and veronal-sodium.

Procaine for novocaine.

Procaine nitrate for novocaine nitrate.

Phenylcinchoninic Acid for atophan.

Under the authority of the Trading with the Enemy Act and with the advice of the Subcommittee on Synthetic Drugs of the National Research Council, the Federal Trade Commission has provided for the manufacture in this country of the important synthetic drugs which before the war were imported from abroad, chiefly from Germany.

To insure the production of the synthetic drugs urgently needed, the Federal Trade Commission had to make it worth while for manufacturers to undertake the preparation of these articles without permitting their cost to become prohibitive but rather approaching the prices current before the war. This was accomplished by granting licenses good for the life of the patents under which such drugs are made and thus making a permanent investment for their production profitable. Partly to insure for manufacturers a market for their products after the war and in large part inspired by the idea of encouraging the establishment of a permanent American industry in these important articles, the commission wisely decided that American houses should be put on the same footing as the foreign houses for the after-the-war competition by imposing on all licenses the obligation to use new, official names for the articles, names which after the war will be open to all competitors, domestic and foreign.

Obviously if these names are once in common use the exclusive rights of the foreign houses and their agents of using after the war the old established trade-marked names will not seriously handicap the American firms, and all competitors will be on the same footing, with the advantage only to those who can produce most cheaply the better article.

It is obvious that the American physician in final instance is the arbiter who can put this wise plan into operation and establish the new names firmly by prescribing these remedies by their new official names. However, *the adoption of these names by physicians will depend very largely on the pharmacist's familiarity with them.* Unless the physician is confident that the pharmacist to whom his prescription is taken is familiar with the official names, he will feel constrained to use the old, proprietary names. The pharmacist,

therefore, should familiarize himself with the new, official non-proprietary names given at the beginning of this letter.

Yours truly,

JULIUS STIEGLITZ, *Chairman,*
Subcommittee on Synthetic Drugs National Research Council.

July 15, 1918.

TO THE PUBLISHER:

Will you kindly call attention through your columns to the need for technically trained persons for the examining corps of the Patent Office. Men or women are desired who have a scientific education, particularly in higher mathematics, chemistry, physics, and French or German, and who are not subject to the draft for military service. Engineering or teaching experience in addition to the above is valued. The entrance salary is \$1,500.

Examinations for the position of assistant examiner are held frequently by the Civil Service Commission at many points in the United States. One is announced for August 21 and 22, 1918. Details of the examination, places of holding the same, etc., may be had upon application to the Civil Service Commission, Washington, D. C., or to this office.

Should the necessity therefor arise temporary appointments of qualified persons may be made pending their taking the Civil Service examination. Application for such appointment should be made to this office.

Very truly yours,

J. S. NEWTON,
Commissioner of Patents.

OBITUARY.

WILLIAM LAWRENCE DEWOODY.

The "Grim Reaper" has exacted another toll to his fateful list of the year. Mr. W. L. Dewoody, honorary president of the American Pharmaceutical Association, died at his home in Pine Bluff, Ark., on Sunday, June 30, in the seventieth year of his age.

The deceased was born at Athens, Ala., on December 30, 1848. His father was a pharmacist and so William early acquired a knowl-

edge of drugs and of the drug plants of his neighborhood and quite naturally took a liking to the drug business. In 1870, he engaged in the wholesale drug business in Pine Bluff, the firm then being Nelson and Dewoody. Later he became the head of this business and this was continued as a wholesale and retail drug store under the name of W. L. Dewoody & Co. until the present.

Mr. Dewoody was a typical southern gentleman and a pharmacist possessing high ideals and the professional spirit of his calling. He was a member of the Arkansas Pharmaceutical Association and for some years served as a member of the State Board of Pharmacy. He was likewise a member of the National Wholesale Druggists' Association.

He joined the American Pharmaceutical Association in 1887 and since that time was one of the most faithful of the members in attendance. His kind manner and lovable disposition won for him a host of friends and he will be greatly missed in the circle of attendants at the meetings of the Association.

JOHN HARPER LONG.

Dr. John H. Long, professor of chemistry at the Northwestern University, died at his home in Evanston, Ill., on June 14, 1918, after an illness lasting for about nine months. His friends and family thought that he was making progress toward recovery of health, when he was overcome by a sudden attack of the heart trouble from which he had been suffering.

John Harper Long was born near Steubenville in December, 1856. In 1877 he was graduated from the University of Kansas, with the degree of B.S. From 1877 to 1880 he studied in the foreign universities at Tübingen, Würzburg and Breslau, receiving the degree of Sc.D. from Tübingen.

In 1881 he was appointed professor of chemistry at the Northwestern University Medical School. In 1913 he was made the dean of the Pharmacy Department of that University and retained this position until last year.

Professor Long was a member of many scientific organizations and in most of these took an active part. He was president of the American Chemical Society in 1903. He had also served as president of the American Association for the Advancement of Science.

As a member of the Council on Pharmacy and Chemistry of the American Medical Association, from the time this council was organized, he had made many investigations in behalf of its work. He was a member of the Committee of Revision of the U. S. Pharmacopœia IX. Likewise, a member of the consulting referee board of experts for the U. S. Department of Agriculture.

He was the author of many excellent papers and was noted for his research work, which was in recent years very largely associated with problems of biologic chemistry.

NEWS ITEMS AND PERSONAL NOTES.

VACANCIES IN THE COMMITTEE OF REVISION OF THE U. S. PHARMACOPŒIA FILLED.—While the members of the Committee of Revision were balloting by mail to fill the eight vacancies on the committee, caused by death since the selection of the committee in 1910, a ninth vacancy occurred by the decease of Dr. John H. Long. The chairman has declared the following nine of the nominees elected to fill the vacancies in the order of the votes they received. E. Fullerton Cook, William B. Day, Samuel L. Hilton, Henry P. Hynson, J. K. Lilly, Leonard G. Rountree, Leonard A. Seltzer, W. J. Teeters, Bernard Fantus.

DEAN LAWALL TO SERVE ON ADVISORY WAR BOARD.—Dean Charles H. LaWall has accepted an invitation to serve as a member of the advisory board to the Division of Medical Industry of the War Industries Board.

Lieutenant-Colonel Dr. F. F. Simpson is Chief of the Division. Stated meetings will probably be held monthly in Washington, D. C.

MR. H. K. MULFORD HONORED BY LAFAYETTE COLLEGE.—At the annual commencement exercises of Lafayette College, Easton, Pa., the honorary degree of Master of Science was conferred upon Mr. H. K. Mulford, Vice-President of the H. K. Mulford Co., of Philadelphia.

PENNSYLVANIA BOARD OF PHARMACY.—The board gives notice that the next examination for registration as Pharmacist or Assistant Pharmacist will be conducted at the Williamsport High

School, Williamsport, Pa., on Friday and Saturday, August 30 and 31, 1918. Applications should be addressed to L. L. Walton, Secretary, P. O. Box No. 265, Williamsport, Pa.

At the recent examinations held in Philadelphia and Pittsburgh, there were 131 candidates for pharmacists' certificates of which 89 were successful and of the 150 examined for license as assistant pharmacists 88 passed the test.

THE COMPLAINT OF THE FEDERAL TRADE COMMISSION AGAINST ELI LILLY & Co.—The Federal Trade Commission has cited the well-known pharmaceutical manufacturing firm, Eli Lilly & Co., of Indianapolis, Ind., to appear before that body and defend themselves against charges of having violated certain sections of the Federal Trade Commission Act and of the Clayton Act. Exception is taken by the Commission to the method adopted by this firm in fixing standard jobbing and retail prices for its products and further that their methods discriminate in price between different purchasers of drugs and further that their contracts of sale contain agreements that the purchaser shall not use the wares of other manufacturers who are competitors.

The "discount sheet" to jobbers or preferred quantity purchasers and the "preference clause" have heretofore been very commonly in use in the drug trade as well as in many other lines of commerce and manufacturing. It would seem that some such method for stabilizing prices of standard wares and to assure the dealer a just remuneration has always been considered as a proper business method.

The outcome of this action will necessarily have an important bearing upon the future conduct of the drug business. While now the cause of considerable unrest and alarm to trade circles, these actions of the Federal Trade Commission will no doubt ultimately result in compelling the commercial interests of the country to see that Congress will enact laws that shall recognize correct and proper methods of merchandizing and the stabilizing of prices and at the same time protect against monopolistic profiteering and deceptive advertising and the unfair methods of price-cutting.

ANTOINE CHRIS COMPANY ESTABLISHED ONE HUNDRED AND FIFTY YEARS.—In commemoration of the one hundred and fiftieth anniversary of the establishment of the house of Antoine Chris at

Grasse, France, their American representative Mr. Burton T. Bush has compiled an interesting succinct history of their activities. This brochure of forty-two pages, with the cover plate "a monument to Leon Chiris erected by the citizens of Grasse, March 29, 1914," is a magnificent example of the printer's art, in style; paper, type, illustrations, press work and presentation of data.

In 1768, Antoine Chiris converted an old monastery, that had been built in 1600, into a factory to distill oils from the flowers and plants growing so prolifically in the vicinity of Grasse. One of the illustrations is a photographic reproduction of the first price-list issued in August of that year.

Through five generations this business has continued in the same family and has been progressively developed along scientific lines. Leon Chiris who at the age of eighteen in 1862 succeeded his father Leopold in the management of the business appears to have been especially active in the development. He purchased 18,000 acres in Algeria and established there an important branch of their manufacturing. To him is attributed the earliest adoption of steam boilers in the distillation of natural perfume oils. Despite his business energy and extensive industrial operations, he took an active interest in civic and political matters and served as a Senator from the Alps Maritimes, and was a Knight and Officer of the Legion of Honor.

In addition to its Grasse and Cannes factories in France and its extensive plantations and factory in Algeria, other factories have been established at Reggio, Italy, and Messina, Sicily, for the production of citrus oils and many agencies throughout the French colonial possessions for the collection of essential oils and perfume products.

The establishment of an American factory at Delawanna, N. J., has been one of the most recent achievements of this house. At this location, 14 acres have been acquired and since November, 1914, their factories situated here have been producing American essential oils, synthetic aromatic chemicals and some pharmaceutical products and "Capes Viscose" which as a capping material are growing in favor with our manufacturers.

The past illustrious history, the scientific basis on which the business has been established, and the business aspirations of the house of Chiris, all bespeak continuous progressive developments for many generations in the future.